MARCH, 1952

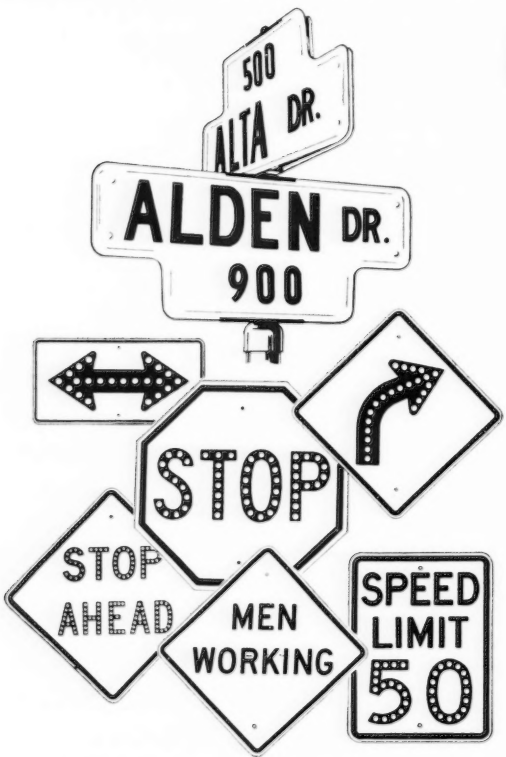
Traffic Engineering

Arroyo Seco Parkway, Los Angeles, Showing Effect of Vehicle Breakdown on Capacity

- Parkways Are Not Accident Breeders in Los Angeles
- Traffic Engineering in the City of Charlotte
- Reduction of Accidents After Nightfall Between Motor Vehicles and Safety Islands
- Effects of Freeways on Adjacent Properties
- Speed Topography
- The 1952 Annual Meeting of ITE and The Engineering Centennial

Official Publication of the Institute of Traffic Engineers

TO EFFECTIVE TRAFFIC CONTROL.....



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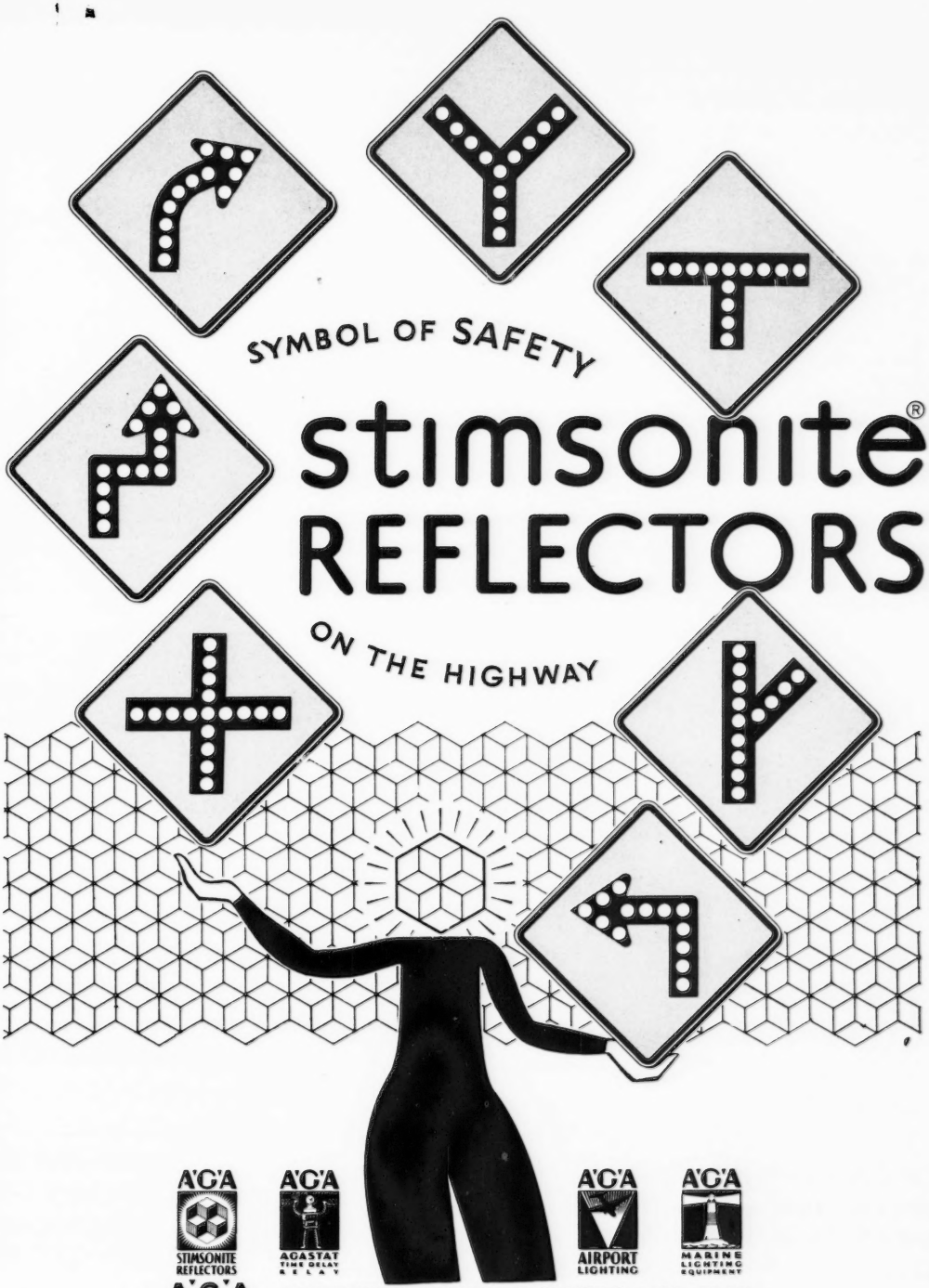

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Traffic Engineering

OFFICIAL PUBLICATION OF THE INSTITUTE OF TRAFFIC ENGINEERS

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COVER: Photograph shows reduction of capacity by 25% caused by vehicle breakdown on the Arroyo Seco Parkway in Los Angeles. To reduce this source of congestion, parking bays have been constructed at intervals along the parkway.—See article by L. W. Gardner.

Photo: Los Angeles Police Dept. Traffic Bureau

Traffic Engineering is that phase of engineering which deals with the planning and geometric design of streets, highways, and abutting lands, and with traffic operation thereon, as their use is related to the safe, convenient, and economic transportation of persons and goods.

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Frankly Speaking

THE tremendous increase in vehicle volumes in urban areas since the end of World War II, and the resulting traffic congestion, demand the individual and collective attention of all persons charged with traffic engineering responsibilities. The complete cooperation between the traffic engineer, the highway engineer, the transit-traffic engineer and all interested civic leaders cannot be over-emphasized.

This overpowering increase in the traffic engineering problem calls for a review of the primary purpose of the traffic engineering profession. On the index page of this magazine the traffic engineering profession is defined as follows: "Traffic Engineering is that phase of engineering which deals with the planning and geometric design of streets, highways and abutting lands, and the economic transportation of persons and goods."

Of primary importance in the above definition is the last phrase, ". . . as their use is related to the safe, convenient, and economic transportation of persons and goods." Perhaps the transportation of persons and goods has not been sufficiently emphasized. We all agree that the street was intended for one purpose—the movement of persons and goods. Much interest has been given to vehicles and too little to persons and goods. At any rate, this seems to be a shortcoming. We realize that we must move persons in vehicles, but we are at times hesitant with the traffic engineering priorities that will expedite the movement of those vehicles carrying the greatest number of persons—mass transit.

There is much that has been said, written and planned by informed parties with reference to the importance and application of transit in the overall traffic pattern. Nevertheless, very little has actually been accomplished in any city in reaching a harmonious balance of appropriate functions of transit and automotive traffic other than initial planning phases. Traffic engineers must seek to put into practice these proposals if the problems affecting congested metropolitan areas are to be solved.

Director

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Parkways Are Not Accident Breeders in Los Angeles

By Lamar W. Gardner (Assoc. Mem., ITE)
Civil Engineer, Street and Parkway Design Division, City of Los Angeles

An explanation of the term "parkway" as used in Los Angeles is in order before continuing to the discussion of accidents. In the days before World War II, when the parkway system was being laid out by the City of Los Angeles, this designation was adopted to insure a landscaped facility which would not depreciate property values and would harmonize with the well improved areas which would be traversed, and would also imply full control of access as is now included in the nationally adopted term "freeway." Having been in use in the City for so many years, the term "parkway" is used throughout this article to denote a landscaped freeway. It has now been well established by the surveys described below that these parkways will have a great and permanent effect on the total motor vehicle accident record in the City and County when a substantial mileage has been constructed.

Accidents in Los Angeles County

In 1949 and 1950, 40.5 per cent of all the injury and fatality motor vehicle accidents occurring in California occurred in the County of Los Angeles. Coincidentally, the vehicle registration in Los Angeles County for 1950 was 40.41 per cent of the total fee paid registration in the State. The Los Angeles Metropolitan Parkway System as proposed covers the urban area of the County where almost all of these accidents occur. Thus it is seen that urban accident reduction in the Los Angeles area alone warrants a great deal of attention in the total State picture.

Urban Versus Rural Accidents

Much has been said and publicized in California concerning traffic accident reduction on rural highways by the use of freeway design opportunities. At the same time very little has been reaching either public officials or the public concerning urban experience where the opportunities for accident reduction are so great. This has probably been occasioned by the slowness of construction of parkways in urban areas because of the much higher cost, which allowed rural freeways to be opened to traffic use in substantial length earlier than the urban sections. However, the wide difference in accident background between urban and rural areas in the matter of relative speeds, densities of traffic, pedestrian concentrations, etc., would seem to justify the value of urban and rural groupings in study and analysis of motor vehicle accidents.

In the City of Los Angeles the density of pedestrian and vehicular traffic and the accompanying annual toll of from 15,000 to 16,000 injury and fatality accidents make it imperative that we consider the ultimate effect that construction of our proposed parkway system will have in reducing this costly and tragic toll. In considering effects within Los Angeles it should be noted that pedestrian fatalities comprise more than 50 per cent of the annual motor vehicle accident fatalities in the City. On our parkways, pedestrian accidents are very rare due to the stiff, six-foot high, woven wire fence which effectively bars pedestrians from the heavy parkway traffic excepting at on and off ramps, where there are signs prohibiting pedestrian entrance.

Fig. 1
Inbound Roadway of Hollywood Parkway in Transition Section to Surface Streets.

Accidents on Parkways

Low vehicle-versus-vehicle accident rates on parkways are, of course, achieved in the main by eliminating the ordinary surface intersection at grade, with its multiple points of possible traffic conflicts, and substituting therefor grade separations. Remaining, and largely making up the parkway accident toll, are weaving accidents, which are, however, being reduced by both improvements in design and enforcement measures, which will be described later. Also included in our present rates are large numbers of accidents on our older parkway sections, occasioned by relatively low standards of early design, such as inadequate median barriers separating opposing traffic, lack of provision for emergency parking, insufficient acceleration and deceleration lanes, sharp curves, etc. The lack of an emergency parking shoulder is well illustrated by the Arroyo Seco Parkway, where the critical evening peak capacity of the outbound roadway is temporarily reduced more than 25 per cent by the breakdown of a single vehicle, and consequent close, dangerous weaving is introduced (see front cover). Additional to the future reduction in parkway accident rates due to the influence of later, safer design, will be

the reduction due to the elimination of temporary terminal areas where the abrupt transition of high volumes of through traffic from parkway conditions to crowded surface streets creates a high accident potential. Large numbers of accidents on the parkways occur as traffic approaches these terminal points. Such a section is shown in the photograph of Figure No. 1, which shows the inbound roadway of the Hollywood Parkway in the transition section from the parkway to the slower speed surface arteries, Cahuenga Boulevard and Highland Avenue. A 5 per cent down grade occasions higher than usual speeds, and last instant decisions as to destination, attended by abrupt weaving, cause many accidents here. This condition will be corrected in 1953 when the connecting link of the Hollywood Parkway is constructed to connect here. Pay-as-you-go financing has caused these costly temporary terminal points, and if current plans for bond financing are achieved, one of the greatest causes for local complaints about our parkways will be removed.

Accidents on Surface Streets and Parkways

In order to compare parkway rates with surface artery rates, two well controlled surface boulevards, Wilshire Boulevard from Grand Avenue to Beverly Hills, and Figueroa Street from Olympic Boulevard to Imperial Highway, were selected. Both of these carried large volumes of traffic under conditions normal to City streets. In a three-year period 600,000,000 vehicle miles were traveled on the two boulevards, while in the same period the Arroyo Seco Parkway carried 426,000,000 vehicle miles, and all parkways in existence in the City carried more than 776,000,000 vehicle miles.

Although accident and volume records for the Arroyo Seco Parkway and for the two surface arteries were available for the earlier years back to 1941, rapidly changing conditions for surface traffic during and after World War II made it advisable to seek a somewhat stabilized period for comparison. Earlier years showed a much higher accident rate on the surface arteries. Immediately after World War II traffic on all available streets increased tremendously, accompanied by alarming increases in traffic accidents. The President's Safety Conference of 1946 initiated local accident reduction programs by all agencies. Coincident with these and subsequent annual drives, thousands of traffic signals and boulevard stop signs were installed, with a resultant decrease in the speed of traffic. Traffic volumes and densities continued to increase, further limiting speeds on surface streets and thereby reducing the severity of accidents. Variations in total traffic fatality and injury accidents within the City of Los Angeles through these years are shown in Figures 2 and 3. Preliminary figures for 1951 indicate a slight drop in both fatalities and injuries for 1951. Having in mind these changing conditions, it appears that the accident record for three years 1948, 1949 and 1950 will give the clearest comparison between parkway and surface traffic operations. The record is as follows:

	Rates Per 100 Million Vehicle Miles for 1948-50 (3 Years)	
	Fatality Accidents	Combined Fatality and Injury Accidents
Arroyo Seco Parkway	0.7	46.5
Hollywood, Ramona and Santa Ana Parkway	2.9	60.0
Combined Parkways	1.7	53.9
Combined Figueroa Street and Wilshire Boulevard	4.2	259.8

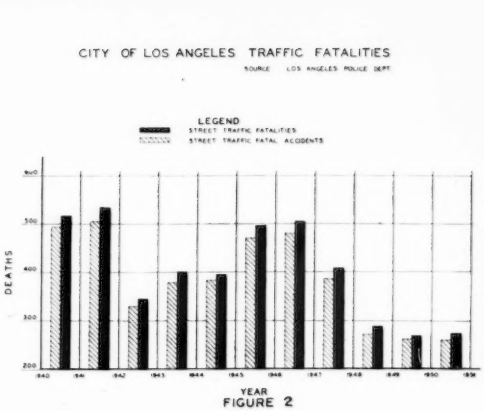


FIGURE 2

The combined accident rate of the surface streets for the three-year period is shown to be 5.6 times as bad as that of the Arroyo Seco Parkway, and 4.8 times as bad as the combined parkways. The fatality rate on these surface streets is 6 times as bad as the Arroyo Seco Parkway, and 2½ times as bad as the combined parkways. Figure No. 4 shows the sections of parkways on which these rates were established. It should be noted that the lengths of the sections are quite short excepting for the Arroyo Seco Parkway, whose length is enough to distribute traffic so that the transition to a surface boulevard is easily accomplished in Pasadena. Also the downtown terminus is sufficiently removed from the Central Business District to allow some distribution to it via a network of surface streets. The same cannot be said of other sections of parkways whose temporary terminal areas created a high accident potential, as was previously stated.

Influence of Design on Accidents

These terminal conditions undoubtedly contribute largely toward the higher rate existing on the Hollywood and Ramona Parkways as compared to the Arroyo Seco Parkway. The Santa Ana Parkway, being of late design, enjoys a very low accident rate excepting for the two fatal accidents which occurred at a temporary terminus containing a very sharp curve. The Arroyo Seco Parkway was constructed about ten years ago to very low standards of design as compared to those of today, with a narrow median strip, one main curve with a minimum radius of 515 feet, and with practically no acceleration or deceleration lanes. However, travel may be continuous on it for seven miles and distribution to the surface streets is relatively good over the greater part of its length. Over the last few years it has had parking bays added, barriers erected in the narrow median strip, and some enforcement against speeding. The Ramona Parkway also has some low standards of design, as the section under consideration was designed about the same time as the Arroyo Seco Parkway. It has a narrow median divider, several rather sharp curves with one of only 439 feet minimum radius, and no emergency parking provisions whatever. On the other hand, newly opened sections of parkways offer very obvious evidence to the driver of the safety values inherent in late design.

In addition to the built-in safety values added by the newer design standards, much consideration is being given to weaving conditions on parkways. On the tangent sections large visible signs are erected, preferably in the median strip, instructing slow drivers to keep right. Recommen-

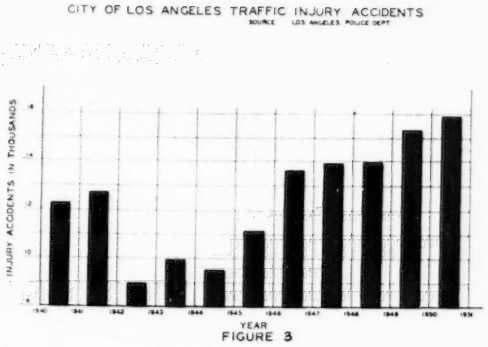


FIGURE 3

dations for these signs were resisted for some years on the grounds that they were not proper signs in that they served only to remind the driver of Vehicle Code regulations. Finally, however, they were installed experimentally on the Arroyo Seco Parkway and a project survey of before and after conditions was carried on by the Institute of Transportation and Traffic Engineering at the University of California. This project found some evidence of driver response, but did not attempt to make findings as to whether there was justification for retention of the signs. They still remain on the Arroyo Seco Parkway and it is said that they will be installed on other parkway sections. In addition to this attempt to lessen the amount of weaving, a recent change in the State Vehicle Code will help the Los Angeles Police Department in a newly instituted enforcement drive against the unreasonably slow driver in the faster lanes. It is planned to carry on this enforcement in 1952 against all slow drivers who refuse to give way to the right on all highways and streets within the City, after an educational campaign has been carried out. In present parkway design every effort is made to provide ample space for weaving. Where heavily used on and off ramps are necessarily separated by only a few hundred feet in order to connect to important surface distribution streets, every effort is made to obtain the best possible weaving conditions commensurate with retention of important distribution. In one section a separate distribution roadway has been added and the on ramps have been grade separated over this roadway.

Capacity Comparisons

In comparing accident records of parkways with surface streets, conditions of travel on both facilities should be noted. In order to carry the very heavy traffic loads now being imposed on surface arteries in Los Angeles, all of the methods known to traffic engineers for increasing capacity are used, including parking bans, the forbidding of left turns, off center laning at peak hours, progressively timed signalization, one-way streets, etc. All of these impose some penalty on the minor traffic movements, but result in favored boulevards passing about 625 vehicles per lane per hour as compared to the 1800 vehicles per lane per hour carried by the inner part of the Arroyo Seco Parkway at peak hours.

Congestion, with its attendant accident potential, also appears on our parkways. Approximately 100,000 vehicles per day are now using the inner stretch of the Arroyo Seco Parkway, and the Hollywood Parkway and its frontage roads through Cahuenga Pass are now carrying about 120,000 vehicles per day. Construction of the Riverside Parkway will relieve both of these of an appreciable part of their

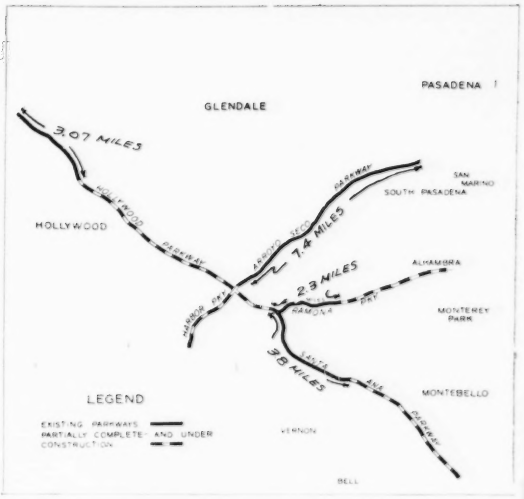


Fig. 4
Map of Parkways in Los Angeles—Showing Distances Covered in Accident Survey.

overload. It is difficult to imagine conditions if these tremendous loads were returned to surface streets.

Speed and Delay Comparisons

Speed and delay conditions on both surface and parkway facilities invite comparison. A widely accepted definition of good transportation is that it is the means of traveling from here to there safely and expeditiously. More than 10,000 observations by the Traffic Engineering Department of Los Angeles have established the average speed of vehicles on the Arroyo Seco Parkway to be 46.4 m.p.h. between 7 A.M. and 6 P.M. It is to be remembered that this is an average speed and that this parkway is substandard as compared to those now under construction. Test runs on surface routes parallel to existing and proposed parkways were made by the Street and Parkway Design Division of the City of Los Angeles. Only well controlled main arteries were used. One east-west and one north-south route was chosen so that typical conditions of urban travel would be encountered, ranging from heavily congested business areas to partially developed residential areas. Six trips were made on each route, including the morning and evening peak hours and other daylight hours between 7 A.M. and 6 P.M. A modification of the floating car method of testing the overall speed of traffic was used, and it was believed by the drivers of the test vehicle that the results indicated the 85 percentile speed rather than an average speed of travel.

On the north-south surface route paralleling the Arroyo Seco Parkway and the proposed Harbor Parkway from Colorado Boulevard in Pasadena to Imperial Highway in southern Los Angeles, an average of all trips showed an overall speed of 20.8 m.p.h. over the 19.2 miles traveled. Seventy-three signals and 257 intersections were encountered. Over this route speeds in one section dropped as low as 6 m.p.h. for a distance of 1½ miles. Comparing this speed on the surface with the average speed of 46.4 m.p.h. established for parkways, it was found that the average

(Continued on page 226)

Traffic Engineering in the City of Charlotte

by Herman J. Hoose (Mem., ITE)
City Traffic Engineer, Charlotte, North Carolina

This is the tenth in a series of articles to be published in "Traffic Engineering" magazine, and written by traffic engineers of cities of various sizes in several parts of the country. The population of Charlotte is 134,000.

IN the period immediately following World War II the City of Charlotte found itself in pretty much the same position as other cities that did not have anyone who could devote their full time to the traffic problems within the area. The city was growing very fast, vehicle registrations were increasing rapidly and traffic was making its bid for attention as a major problem in the operation of the city.

Traffic problems were being handled as best they could by persons in the city government who already had other full-time jobs which demanded their attention. Attempts to solve the traffic problems were hit-or-miss affairs based on few, if any, facts with the consequent results that the problem usually stayed where it was or else was moved to another location without actually giving any real relief.

Finally, in the summer of 1947, the City Manager requested that the City Council authorize him to secure the services of a qualified traffic engineer and that an appropriation be set up to operate such a department. The Council was unanimous in granting this request, and in February, 1948, the position of traffic engineer was filled.

Present Traffic Engineering Division

The Traffic Engineering Department has full departmental status in the city government with the Traffic Engineer being directly responsible to the City Manager.

The office staff of the department consists of:

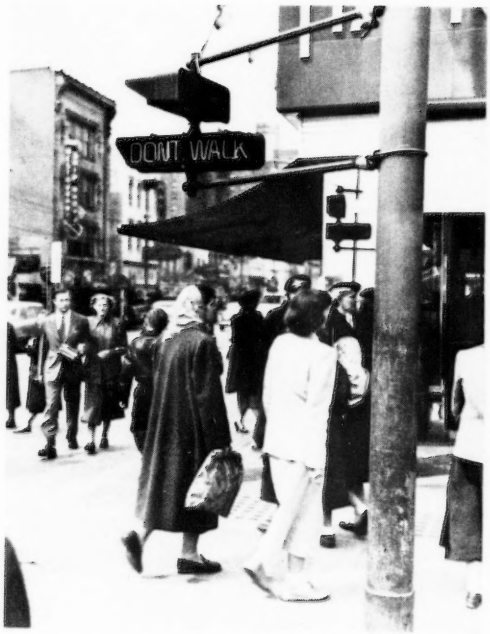
1 Traffic Engineer
1 Assistant Traffic Engineer
2 Traffic Investigators
1 Draftsman
1 Secretary

The staff conducts all of the usual office routine, processes all complaints or requests and carries out various other assignments which may develop. Additional personnel is employed whenever they are needed for survey work. Accident location files and spot maps are maintained by the Traffic Division of the Police Department and these files are available at all times to the Traffic Engineering Department.

Responsibilities

The routine responsibilities of the department include the following:

1. Authorization of all street lights
2. Approval of all curb cuts
3. Designation of all loading zones and bus stops
4. Determination of signal locations
5. Signal installation and timing
6. Signal maintenance
7. All paint markings
8. The location, installation and maintenance of all traffic control signs
9. Installation and maintenance of all street markers
10. All intersection design and redesign, curb radii changes, etc.
11. The establishment of through streets
12. Location or removal of all parking meters



Pedestrian Signals in Downtown Charlotte.

Signs, Signals and Markings

The Traffic Engineering Department maintains its own sign and signal shop. A shop superintendent coordinates the activities of all personnel assigned to this work.

All signs used are fabricated in this shop and they conform as much as possible to the accepted uniform standards for signs. One sign layout man works full time on signs. Men from other crews are used whenever there are rush orders, and paint marking crews work on sign fabrication and repair whenever weather does not permit them to paint

on the streets. One sign crew consisting of two men and a specially equipped truck erect all of our signs.

All of our signal repair work with the exception of certain types involving electronic equipment is done in the signal shop. The technicians who do this work have been trained at the signal factories. Four signal technicians are employed for the erection and maintenance of all signals. There are two ladder trucks in this section, equipped with radios connected to the city police network. At night and on weekdays and holidays there is always a truck on call for emergencies.

Two paint marking crews do our paint work on the streets. The centerline and lane line crew consists of three men with a painting apparatus mounted in a jeep station wagon. We are able to paint in Charlotte during all but about three months out of the year. Another jeep equipped to paint center and lane lines is sometimes put into service to supplement the other crew in case the painting program gets behind schedule due to bad weather or other causes.

One crew consisting of two men and a truck maintains all of our crosswalks, stop limit lines, parking space lines and word messages on the pavement. Hand-operated paint guns are used for all of this work except the word messages which are usually sprayed on a stencil with a paint machine. Crosswalks are maintained at all signalized intersections that have an appreciable amount of pedestrian traffic. Another crew of two men and a truck place and maintain all street name markers within the city.

A construction crew consisting of a foreman and three men construct all of the channelization islands, change curb radii, place signal detectors and perform various other duties depending on the work to be done.

These nineteen men mentioned above make up the maintenance division of the Traffic Engineering Department.

Budget

The budget for the Traffic Engineering Department for the year 1951-52 is $108,214, but this figure does not include money for traffic signals, channelization, or any equipment purchased by the department. The money for capital outlay varies from $50,000 to $65,000 per year, depending on the program to be carried out. Also not included in the above figure is some $99,000 for street lighting expenditures.

ROUTINE ACTIVITIES

Street Lighting

All street lights to be installed in the city must first be authorized by the Traffic Engineering Department. After investigation and approval these lights are installed and thereafter maintained by the local power company with the charges for lighting being paid by the Traffic Engineering Department.

Curb Cuts

All requests for driveways within the city must first be approved by the Traffic Engineering Department. The standards set up for curb openings include the following stipulations:

(1) The width of no driveway shall exceed thirty (30) feet and no business establishment shall have more than two such drives provided the two are separated by an island not less than twenty (20) feet wide.

(2) Driveways for corner properties may not begin any closer than fifteen feet from the intersecting property lines.

(3) The radii on any driveway may not exceed five feet.

Signal Heads Over Driving Lanes Have Replaced Old Center Suspended Type in Charlotte.

Sketches for proposed driveways, showing desired width of drive and its location with reference to the property lines, and to any other driveways located on the property, are submitted to the department. Upon approval, these requests are forwarded to the City Council for final approval before a permit is issued. In the event there is no curb and gutter on the property where driveways are proposed the owner is required to construct curb and gutter when the driveways are built. These regulations have proved very effective in our efforts to control driveway locations within the city.

Curb Parking Control

In order to keep traffic moving it has been necessary to prohibit parking on some of our city streets. Where streets are very narrow the parking has been removed from one or both sides in order to accommodate two lanes of traffic. Where space for additional lanes is needed and we are fortunate in having the necessary width the parking is prohibited on one or both sides during hours of rush traffic, or in the case of high off-peak volumes it is prohibited at all times.

The location or removal of parking meters is a function of the Traffic Engineering Department, however, the maintenance, repair and collections are under another department of the city government. The revenue from these meters exclusive of operating expenses, is used as part of the budget monies allocated to the Traffic Engineering Department.

Metered Parking Space

The parking meter area within the central business district has been zoned with concentric rings of parking time limits. In the center of the business district there is a 36 minute parking limit. (This limit also applies to space near municipal buildings, etc., where a large turnover of short-time parkers is desired). The second ring spreading out from the center of the district is the 60 minute parking limit, then the 90 minute area followed by the 120 minute meters. In all, there are some 1,150 parking meters in Charlotte.

The parking limits were established because a survey revealed that the majority of parkers at the curb in the central business district desired to park for a short time. These parking restrictions are enforced by a group of uniformed *policewomen* and enforcing these regulations is their only duty.

Loading Zones and Bus Stops

All loading zones and bus stops must be authorized by the Traffic Engineering Department. Requests for loading zones are investigated to ascertain whether or not it might be possible to load or unload off the street or perhaps from other nearby loading zones. Next, the size of zone is determined and also the hours of operation which are needed. The majority of our loading zones are specified for loading and unloading purposes only until 3 P.M.; after that they are used for parking space.

All loading zones are marked off by the department when they are allocated and their location is given to the police department for enforcement purposes.

SPECIAL ACTIVITIES

Signal Improvements

The downtown signal system was replaced last year with a flexible progressive system capable of handling the traffic volumes as they fluctuate through the day. The improvements that this system offered in comparison to the previous one were both immediate and obvious to the motoring public. On other streets outside of the central business district, all groups of signals are interconnected for progressive movement. At complex intersections where the volumes vary greatly, traffic-actuated control has been employed to handle the traffic. This has proven to be very effective.

The city has just completed a program in which signal heads are suspended over the driving lanes at all signalized intersections rather than center-suspended.

Pedestrian control signals are used in the central business district at all locations where the volumes are great enough to justify their use. These signals work in conjunction with the traffic signals and there is no separate interval for pedestrians alone.

Channelization

The Traffic Engineering Department has redesigned some 10 or 15 major intersections in order to improve the flow of traffic. Details have already been worked out to complete the few remaining locations needing this treatment. On several redesign and widening projects the department has worked in conjunction with the City Engineer to bring about the needed improvements. A program to change curb radii wherever possible to facilitate turns is now about 90 per cent complete throughout the city.

At the present time a new street is under construction to afford another artery from the eastern section of the city to the downtown area. This street must cross several sets of railroad tracks and these crossings will be by grade separation. Another project to be begun as soon as the remaining right-of-way detail can be completed involves a three-mile extension of an arterial street. This project will be a four-lane street having two grade separations and two bridges, and will be of great help in assisting to relieve the congestion now experienced on some of our overloaded streets. Plans are being worked out with other engineers to eliminate railroad grade crossings within the city, starting with the ones which are most hazardous.

Intersection Channelization in Charlotte.

Truck Route

In 1951, a truck survey was made and the resulting report included recommendations for the establishment of a system of truck routes in order to relieve the central business district of some of the delay and congestion brought about by the presence of so many heavy trucks on the city streets. The system of routes was approved by the City Council and an ordinance was passed forbidding through trucks to use the central business district. Only those heavy trucks making a delivery in the area or returning to the truck route from a delivery are to be exempt from a fine. As a further means of keeping the traffic moving in the district during the morning and afternoon peak hours there is a critical area in the center of the business district from which all heavy trucks, making deliveries or otherwise, are prohibited during the hours of 7:30 to 9:30 A.M. and 4:30 to 6:30 P.M. It is believed that this system will prove its merit in a very short time.

Parking Survey

The City of Charlotte has a Parking Authority which was organized one year ago. The appointment of such an Authority grew out of the demands of the people for a study of the parking situation. This group has secured state legislation defining the city's legal powers in the provision of parking facilities. The legislature declared that the city has a right to purchase, operate, or lease land for the purpose of parking. The legal right to finance the purchase of such lots by the sale of bonds and the right to assess a part of the cost of such parking lots to all benefited properties was also a part of the state enabling legislation.

In order to formulate a sound parking policy, the Parking Authority directed the Traffic Engineering Department to make a parking survey. All of the necessary data for the report has been gathered and is now in the process of being analyzed. For the survey an inventory was made of all present parking, both on and off-street. A store door count was made to determine customer modes of transportation and a land-use map was prepared to show how the central business district is now being used. It is hoped that the final report will lead us to some definite ideas on what should be done to relieve the parking situation and in which section within the area such relief should be sought.

(Continued on page 224)

Reduction of Accidents After Nightfall Between Motor Vehicles and Safety Islands

By T. M. Vanderstempel (Mem., ITE)
Traffic Engineer, Bureau of Street Traffic, Chicago, Illinois

DURING the latter part of 1950 it became evident that the ever increasing number of collisions of motor vehicles with safety islands at streetcar loading zones in Chicago, called for measures leading to a reduction, if not entire elimination, of this type of accident.

Before means could be devised to achieve this goal it was necessary to analyze the cause of the accidents as well as try and observe their occurrence, or examine the locations and contributing circumstances immediately after they took place. To obtain this, a special investigation was launched using police cruisers to answer all accident calls in districts where safety islands were located. This tour of duty included eighty-four hours of cruising after darkness, with one night of rain, two nights of fog, one night when the streets were freshly coated with ice and subsequently covered with snow, one night of testing the light intensity at various safety islands with a high accident rate, and one night of driving to establish the "threshold"* distance of visibility.

Accidents at Safety Islands in Chicago

The City of Chicago, at the time this investigation was made, had 1099 safety islands, and during 1949 and 1950, nearly one-quarter, or 23.2%, 255 to be exact, caused 475 collisions. Table I shows the frequency of recurrence at the various islands.

TABLE I
Accidents Involving Safety Islands

157	safety	islands	had	1	accident
50	"	"	"	2	accidents
21	"	"	"	3	"
10	"	"	"	4	"
10	"	"	"	5	"
1	"	"	"	6	"
3	"	"	"	7	"
1	"	"	"	11	"
1	"	"	"	13	"
1	"	"	"	14	"

The predominating phenomenon was that 97.3% of these accidents occurred during the hours of darkness. This seemed to indicate that the lighting of the safety island abutment had a deficiency which made it impossible for the motor vehicle driver to discern it far enough in advance to enable him to prevent a collision.

*Threshold distance is the distance between observer and the object when the latter becomes discernible to the driver.

Factors in Night Visibility

Before analyzing this particular situation it is well to review some of the requirements of proper lighting of objects which may be found in the line of travel, as determined by exhaustive experiments and tests conducted by the Illuminating Engineering Society.

Visibility is basic to all aspects of traffic safety. The term visibility, as applied to night driving, denotes the extent of detection and recognition of important roadway details and objects by a driver possessing so-called normal vision, and moving at legal speed. The fundamental factors which directly influence visibility are:

1. The brightness of objects on the roadway.
2. The size of the object and its identifying detail.
3. The brightness contrast between the object and its surroundings.
4. The color contrast between the object and its background.
5. The time available for seeing.
6. Extent of interference with seeing due to glare.

The best practical visibility on streets at night is provided by lights of adequate intensity and proper distribution and direction to bring the above six fundamentals into proper correlation.

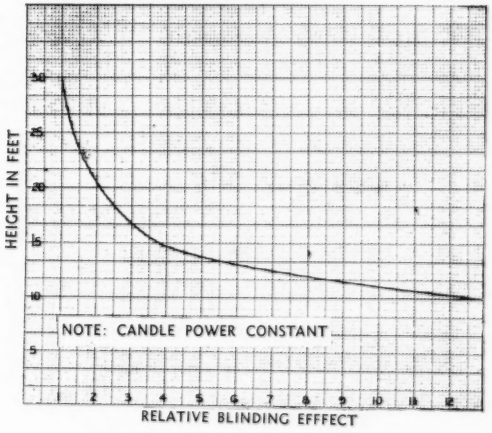


Fig. 1
Relative Blinding Effect From Luminaires at Different Mounting Heights

Night Visibility of Safety Islands

Evaluation of the degree of visibility produced by a lighting installation at a safety island involves consideration of four principal factors.

1. The brightness of the island abutment at various points.
2. The brightness of objects on the roadway.
3. The color contrast of the abutment with its background.
4. The glare attributable to the lighting installation and surrounding lights of commercial establishments.

Under daylight conditions, all the attributes for good visibility are generally available. However, under night conditions where illumination is quite limited, the lighting of obstructions—in this particular case the abutment—should approach as closely as possible the daylight visibility, and this *was not* generally the case.

Good visibility at night may be obtained by adequate pavement brightness with a high degree of uniformity and appropriate illumination of objects placed on or along the thoroughfare, together with reasonable freedom from glare. A series of light intensity tests together with measurements of "threshold" distances were taken to determine the point at which the abutment became visible. This, in turn, provided information to determine whether or not a driver, at various speeds, may avoid contact with an abutment when its location was previously unknown to him. In order that the tests conducted may be visualized, Table 2 shows the details of four high accident intersections during 1949 and 1950 where safety island abutments were involved.

Fig. 2
Improved Abutment Lighting Unit For Loading Zones in Chicago.

TABLE 2
Discernibility of Evaluated Abutments

Location of Abutment	Direction of Travel	Threshold Distance (feet)	Light * Intensity On Abutment	Number of Accidents	Total per Intersection
S. Wabash and	SB	185	1.75	7	
15th	NB	323	1.60	4	11
N. Western and	NB	292	1.00	4	
Cornelia	SB	153	1.81	3	7
Broadway and	NB	355	1.52	5	
Catalpa	SB	261	1.67	8	13
Broadway and	NB	290	2.74	2	
Rosemont	SB	261	2.25	12	14

Table 2 shows that the maximum "threshold distance" for the four abutments was 355 feet with a low of 153 feet. It was therefore apparent that improper lighting plays an important role in the accident occurrence at these safety islands.

Lighting Improvements Recommended

Considering the hazard of the abutments, the conclusion was drawn that they should be illuminated with an intensity of at least ten times the IES minimum recommended standard of 1.2 foot-candles horizontal illumination on the roadway. That is, illumination of the abutments should be 12 horizontal foot candles to properly forewarn the approaching driver.

Observations at night indicated that the flashing upper and lower beacons tended to have a blinding effect upon the approaching driver, without adding to the lighting efficiency of the abutment. Figure 1 was prepared from the data supplied by the I.E.S. and shows the relation between height of luminaire and varying degrees of glare.

Although glare cannot be measured to an extent where a factor can be established, denoting the critical point beyond which it could be said danger is experienced by all drivers of motor vehicles, Figure 1 conclusively shows that lowering the luminaire more closely to the line of vision is detrimental to proper ocular comfort, and every individual has a different susceptibility to the degree of glare.

Laboratory tests and field experiments have established the following characteristics of glare:

1. All the effects of glare are diminished as the luminaires are removed from the center of the field of vision.
2. Increasing the brightness of the surrounding area reduces glare and improves visibility.
3. The discomfort effect of glare is diminished by reducing luminaire brightness through increasing the illuminated area.
4. The blinding effect of glare is diminished but little with considerable decrease in luminaire brightness, if the candlepower toward the eye remains the same and all other conditions are unchanged.

For these reasons it was concluded that elimination of the flashing beacons and the installation of one fixed beacon

*Light intensity was determined with the aid of a foot candle meter, for various locations on and near the abutment.

Fig. 3
View of Approach End Treatment of Loading Zones Before and After Improvements. (Zones Are Not at the Same Location).

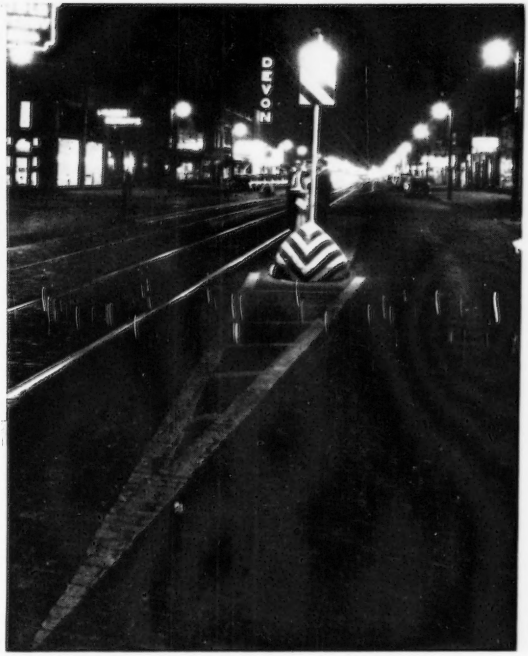


Fig. 4

(see Figs. 2 and 3) at a considerably higher elevation above the pavement, and consequently removed from the visual axis, would eliminate glare and increase the ocular comfort of the driver, thus enhancing his ability to discern the presence of the abutment together with its identifying and orienting contour during the hours of darkness.

It was decided that the fixed beacon was to have a light diffusing amber lens facing the oncoming traffic with a light intensity not exceeding 25W, a base light of 100W, flooding the abutment, and another light, not exceeding 60W, illuminating the target (see Figure 2).

Stopping distances assumed for the purpose of this study are shown in Table 3. From Table 3 it is evident that in order to miss any obstacle in the line of travel it must be visible at a distance of at least 250 feet if a speed of 40 m.p.h. is not exceeded. With a speed of 50 m.p.h., which, although excessive, is not uncommon for emergency vehicles, a threshold distance of at least 360 feet must be adopted. This will be accomplished with a beacon arrangement such as shown in Figure 2 where the light intensity on the abutment will be twelve foot candles as previously discussed.

Other Improvements Recommended

In order to accentuate the presence of the safety island and its abutment more forcefully, it was decided to paint the abutment with reflectorized, white paint with inverted black striping. This shows the abutment more clearly to the driver, during daytime as well as during the hours of darkness.

To further call the safety island to the attention of the approaching driver it was decided to use approach striping to insure proper channelization. Although it is true that during certain times of the year these lines would be covered by snow, they are bound to train the motorist to the obvious necessity of adjusting his driving habits well in advance in order to be prepared to enter the narrow available space to

(Continued on page 226)

TABLE 3
Stopping Distance at Various Speeds

Speed M.P.H.	Driver Perception-Reaction Time (Seconds)	Driver Perception-Reaction Distance (Feet)	Brake Reaction Time-Distance Time (Seconds)	Brake Reaction Time-Distance Distance (Feet)	Vehicle Braking Distance	Driver Stopping Distance
10	.875	12.6	.6	8.7	6.4	19
20	.875	25.2	.6	17.6	29.3	55
30	.875	38.5	.6	26.4	121.5	160
40	.875	51.1	.6	35.4	148.9	250
50	.875	63.7	.6	44.0	296.3	360
60	.875	77.0	.6	52.8	403.0	480

Effects of Freeways on Adjacent Properties

Compiled and Submitted by Henry K. Evans (Mem., ITE)
Highway Transportation Specialist, Transportation and Communications Department
U. S. Chamber of Commerce

MUCH interest is being displayed today in the question of what happens economically speaking to the area adjacent to a new freeway or expressway, both before and after construction of the new facility.

This question was put to the highway authorities in several cities. This memorandum includes excerpts from their letters, and is intended as an item of interest to those who are concerned with highway planning.

1. *Has the adoption of a freeway plan as a feature of the master plan had detrimental effect in impeding development by discouraging private investors or owners of adjacent property?*

Baltimore (Director of Public Works): "There is nothing concrete in the record to indicate that the adoption of a master freeway plan is detrimental or discouraging to the development of nearby property by private investors. We are firmly convinced that adoption of such a plan has just the opposite effect in that it removes all possibility of heavy through traffic conflicting with the residential use of the nearby land; and, through the proper spacing of interchanges, provides direct and high speed vehicular access to the center of the city."

Cleveland (Planning Director): "I think that the adoption of a freeway plan here in Cleveland has had a very definite discouraging effect on building within the future rights-of-way for freeways. Of course, that is the very thing that we are attempting to discourage so as to minimize the ultimate cost of the freeway. We have found from our experience here that while development has been discouraged on the as yet unpurchased right-of-way for freeways, that by knowing specifically where the future freeways will fall has encouraged development by private investors on adjacent property."

Detroit (Public Works Commissioner): "Detroit has adopted an over-all plan of freeways of which two only are precisely located and are under construction. They are almost entirely of the depressed type. So far as we are aware they have had no detrimental effect on adjacent property."

Los Angeles (City Engineer): "It appears that the delays incidental to the final establishment of a parkway location may be detrimental to the development of the area immediately affected. As soon as the plan has been definitely fixed, development appears to proceed in a normal manner, taking full advantage of the transportation benefits soon to accrue from the parkway construction. After a parkway has been placed in operation it becomes one of the fixed and permanent conditions, and private development is capable of proceeding more securely than before."

New York (Director of Research and Planning): "As far as we have been able to determine, the adoption of freeway routes, as part of the Master Plan of the City of New York, has not had any detrimental effect in impeding development by discouraging investors or owners of adjacent property."

2. *Where freeways have been constructed, what has been the effect on the city tax base and on private development in connection with property adjacent to or near the freeways?*

Baltimore (Director of Public Works): "Our freeway construction has not progressed far enough to give any conclusive answers. The freeway that we are now constructing is mainly through undeveloped property, and there has been no change in the tax base of the vacant land abutting or in the vicinity of this right-of-way. We do feel, however, that completion of this project will open the way for an orderly and well-planned development of the nearby land, by providing better access to the commercial and industrial areas of the city. The lack of adequate highway facilities has been a major factor in retarding the development of this land."

Boston (Planning Director): "The Massachusetts Department of Public Works has adopted a Master Highway Plan for the Boston metropolitan area. The plan is intended, in the main, to consist of freeways . . . and its estimated cost is around $600 million. . . . In selling the plan in Boston, particularly on the Central Artery which is close to the downtown area, we have claimed that it would result in enhancement of values, if not on the property adjacent to the freeway, certainly in its vicinity, and that it would stabilize values in the whole downtown area."

Cincinnati (Director of Public Works): "We have no knowledge of the effect our expressway plans may have had on property adjacent to the right-of-way lines, but since our plans call for parallel service roadways on each side of the limited access roadway, it seems reasonable to anticipate that land values along the service roads or streets will advance, particularly where the land is in the vicinity of an interchange.

"We do know that land values along a modified expressway (with driveway access) recently completed have increased up to 400%.

"In general, it is our belief that though freeway construction removes many parcels of taxable land from the tax list, it is very probable that selection of routes to form barriers between areas wherein the land use differs will result in increases in value of the remaining lands on either side to an extent that would probably recapture the lost taxes."

Cleveland (Planning Director): "We have not as yet built enough of our freeways to really know what the effect a total system would be on the city tax base. I would guess that when a sizeable portion of the system is built that the

(Continued on page 226)

Speed Topography

By Michael Powills Jr.
Traffic Engineer I, Bureau of Street Traffic, City of Chicago

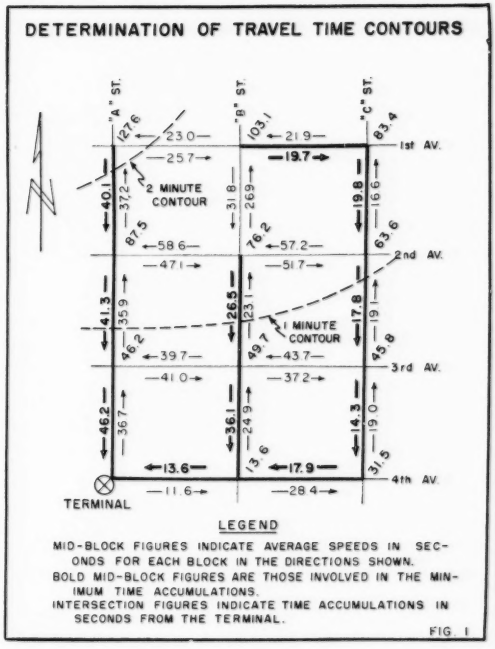
AMONG the aspects to be considered in the location of public or private facilities such as large commercial establishments, terminals, access points to bridges and expressways, etc. is the travel time of users of such facilities. This travel time may pertain to pedestrians, private vehicles, mass transit vehicles, or other public carriers. This discussion is concerned with the travel time of private vehicles, and is primarily intended to describe a method rather than a specified case result.

The Chicago Plan Commission in its current studies involving a plan for consolidating several of the existing railroad terminals into one new terminal took cognizance of the above-mentioned aspect of locating such a facility and developed a graphical representation of the facts involved. The point in question was a comparison of private vehicles and taxi travel times from points within the Central Business District of Chicago to the proposed terminal as against similar times from the Central Business District to the existing railroad terminals. The method required the development of a map showing the time topography of the Central Business District.

Prior to the Plan Commission's study of the travel time relative to a consolidated terminal, a special traffic survey of the Central Business District had been made at the request of the Mayor of the City of Chicago. Fortunately, this survey included data of a nature useful to the problem at hand. "Floating car" speed checks had been made in both directions on all streets within the Central Business District. This was the first item involved in a determination of the facts. In addition, however, since none of the terminals under study were located within the Central Business District proper, similar checks had also to be made on all possible streets between the terminals and the Central Business District.

The mechanics of the floating car check involved a typical weekday between the hours of 8 A.M. and 6 P.M. Nine crews of two men each were assigned to a total of 11.27 linear miles of streets. Nine survey vehicles were used giving each crew a little over one mile of streets to cover. Within the above hours each crew was able to make an average of thirteen runs in each direction on its assigned route. (The minimum number of runs made on any single street in one direction was eight and the maximum number was twenty-five). A total of 290 vehicle miles were traveled by the nine survey crews.

The actual procedure involved in making the speed checks was for the driver of the survey vehicle to pace the speed of his vehicle with that of the average speeds of the vehicles around him. His method of estimating this was to pass a number of cars equal to that of those who passed him. The driver would indicate to the recorder that instant at which the center lines of successive streets were crossed. The recorder would in turn note the time of this instant to the nearest second. By conducting this operation along


DETERMINATION OF TRAVEL TIME CONTOURS
"A" ST.
"B" ST.
"C" ST.
1st AV.
2nd AV.
3rd AV.
4th AV.
2 MINUTE CONTOUR
1 MINUTE CONTOUR
TERMINAL
LEGEND
MID-BLOCK FIGURES INDICATE AVERAGE SPEEDS IN SECONDS FOR EACH BLOCK IN THE DIRECTIONS SHOWN.
BOLD MID-BLOCK FIGURES ARE THOSE INVOLVED IN THE MINIMUM TIME ACCUMULATIONS.
INTERSECTION FIGURES INDICATE TIME ACCUMULATIONS IN SECONDS FROM THE TERMINAL.
FIG. 1

all streets in each direction on a block by block basis, the average length of time required to travel any given block within the Central Business District in either direction could be determined.

The next step in making the desired comparison was that of indicating on a map of the area these average travel times of each block of street in each direction. For each specific terminal then, travel time accumulations were built up between the terminal and points within the Central Business District. In order to be as comprehensive as possible, it was decided that each intersection within the Central Business District should be considered as a possible origin point for travel to each of the terminals. As may be seen in the example in Figure 1, the method actually involved, because of simplicity of calculation, the accumulation of time from the terminal to the origin points rather than vice versa. It should be noted, however, that running speeds to, rather than from, the terminal were used to accomplish this.

Proceeding from the terminal in the general direction or directions of the farthest point or points of the Central Business District, the travel time was accumulated block by block. In general, this involved nothing more than a simple addition of the time for a given block to the previous given total of time for the shortest distance back to the

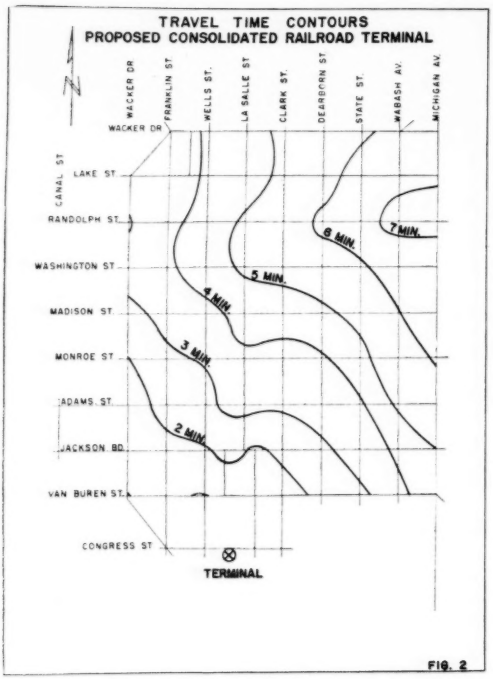


FIG. 2

terminal. Referring again to Figure I, this may be seen in moving from the intersection of Third Avenue and "A" Street to Second Avenue and "A" Street. However, since the travel times were built up in a fan-like direction radiating out from the terminal, it was frequently found that the shortest travel time to the terminal was not necessarily the shortest distance. For example, if in calculating the times along two parallel streets, such as "B" and "C" streets in Figure I, it was found that one of the two, "C" Street, was "faster," it might be more advantageous time-wise to move from intersections on the "slower" street ("B" Street) to those on the "faster" street and then to the terminal, even though the extra distance might be as great as one or two blocks. This occurred in the example shown, along First Avenue from "B" to "C" streets. There were even cases of a two block reverse ride giving better time to a given terminal. (This was true in the Central Business District in the case of routes using Michigan Avenue or Wacker Drive). One additional point which had to be continuously kept in mind was the general prohibition of left turns within the Central Business District of Chicago. Obviously, time routings could not be set up which involved illegal traffic movements.

Once the travel times from each intersection to a specific terminal had been plotted on a map of the area, time contours could be set up for the given terminal. Time contours are, of course, similar to other contours in that they connect points of equal values. In this case the points are those of equal travel times to the terminal. The time contours were plotted at one minute intervals, and since there were few, if any, intersections being an even number of minutes away from the terminal, practically all points on the contour lines were interpolated. This interpolation was done on a graphical basis. For example, if two successive intersections along Street "A", namely Third and Second Avenues, were 46.2 and 87.5 seconds respectively away from the given terminal then the one minute contour crossed Street "A" 33.4% (or 35%) of the distance between the two intersections, from Third Avenue.

After the travel time contours had been plotted for each of the terminals (see Figure 2) the next step was a comparison of the proximity, time-wise, of the Central Business District to the proposed terminal as against each of the existing terminals. This was accomplished by superimposing the time contour lines for each of the other terminals on those of the proposed terminal and then connecting the points established by the crossing of equal contours for each pair of terminals. The results of this operation can be seen in Figure 3. Any point along this new line is equidistant, time-wise, from each of the two terminals being considered and any point between the line and a given terminal is closer to that terminal. In other words, the line demarks each of the two areas of the Central Business District more readily accessible to the two respective terminals. Through the use of a planimeter the actual size of these two areas may be accurately determined to obtain the percentage of the Central Business District which is closest to each location.

The City of Chicago has recently put into effect a system of one-way streets in the Central Business District. As yet no such studies as outlined in the preceding paragraphs have been made under this new traffic flow scheme. It should be interesting, however, to see what effect the one-way operations have on the time topography of the Central Business District.

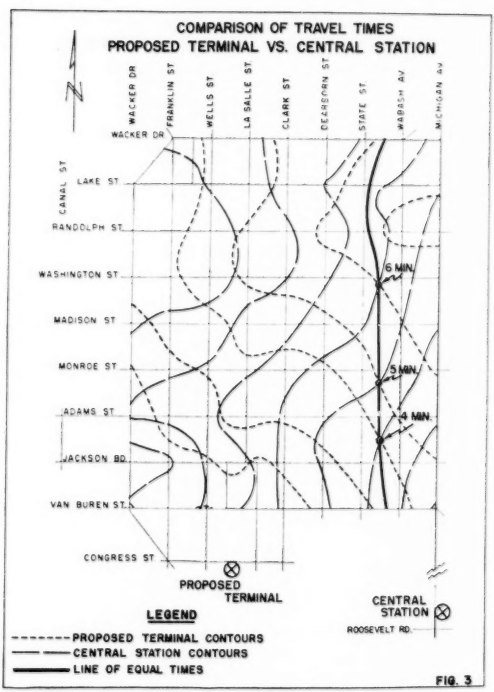


FIG. 3

The 1952 Annual Meeting of ITE and The Engineering Centennial *

By G. Donald Kennedy (Mem., ITE)
Consulting Engineer and Assistant to President, Portland Cement Association

IN Chicago and throughout the nation during 1952 the engineering profession is celebrating its centennial, since this year marks the founding of the first civilian national engineering society. The American Society of Civil Engineers was founded in 1852. Prior to that time national engineering organizations existed only in the military field. The organization of the American Society of Civil Engineers created a society for all non-military engineers. The 1952 Centennial includes and honors all engineering societies including the *Institute of Traffic Engineers*, which is now nearly a quarter of a century old. More importantly, however, it offers the engineering profession an opportunity to acquaint the public with the part engineering has played in developing America and to forecast the contribution that engineering will make to the future of our land.

The *Institute of Traffic Engineers* plays a significant role in this concept. Its members serve the public by improving the movement of people and vehicles with safety. It activates a large segment of private enterprise as it increases the capacity for movement on our public streets and highways. Because of the nature of the traffic engineer's work, ITE has a special stake in the Centennial.

Features of the Centennial

The outstanding feature of the Centennial will be an exhibit to be constructed at the Museum of Science and Industry under the direction of Major Lenox R. Lohr, President of the Centennial Corporation. Charles F. Kettering is Chairman of the Executive Committee and the fund raising group. It is expected that the exhibit will be built to last five years. The exhibit is intended to contribute to the public education program.

A second feature of the Centennial will be a dramatic stage production to be conducted during the summer months at the Museum of Science and Industry.

The Centennial also expects to bring the message of engineering to the people of the United States through special booklets for school children and through other media of communication such as the press, radio, motion pictures and television.

During the convocation a series of 12 symposia, devoted to basic engineering subjects of education, transportation, communication, energy, structures, urbanization, metals, chemicals, tools, food and health will be presented.

Forty-one engineering societies with a total membership of some 300,000 men and women will meet in Chicago between September 3 and 13. This will be the world's greatest convocation of engineers. Each society is holding its own scheduled meeting with arrangements according to its own custom. Under this schedule the *Institute of Traffic Engineers* will meet between September 8 and 11, 1952 with headquarters at the Sherman Hotel. Each of these society meetings is individually financed and operated. During this period many activities of interest to all societies will be held. September 3 is to be designated International Day and September 10 is Centennial Day. Engineering awards will be jointly presented by various societies on this occasion.

The ITE Annual Meeting

The *Institute of Traffic Engineers* is a component part of the engineering convocation and the engineering centennial. It is peculiarly so since the field of interest of traffic engineering cuts across the basic fields of applied science such as electrical, mechanical and civil engineering. While the *Institute of Traffic Engineers* may be considered relatively young in comparison with the so-called founder societies, it performs an important function in advancing the American way of life. The *Institute* has a special obligation to help make the public aware of the nature of its service.

The General Chairman for the 1952 Annual Meeting of the *Institute* is Leslie J. Sorenson. No one could be better fitted to give the high type of professional leadership that is needed on this occasion. His public standing in this community, brought about by a long period of constructive public service, will facilitate the work for the occasion.

I have talked with our President, Nathan Cherniack, about the 1952 Annual Meeting. In harmony with the objective of the Centennial, it is his purpose to broaden the horizon of the traffic engineer as well as to explain to the public what the traffic engineer does. He does more than move traffic safely and efficiently in ever-increasing volumes. He has an important part to play in making a contribution to our social structure.

In arranging the program for the meeting, the most outstanding speakers available should be obtained. The Coordinating Committee on Technical Programs is meeting each month and principles have been laid down to guide in the development of programs to effectively carry out the theme of the Centennial. George Barton officially represents ITE as a member of the Technical Program Coordinating Committee and is chairman of the Technical Program Committee for the *Institute of Traffic Engineers* Annual Meeting. It is hoped that the convocation will give an opportunity for societies to hold joint sessions in fields of common interest.

In the development of arrangements for the *Institute of Traffic Engineers* Annual Meeting it is well to keep in mind the gearing of normal functions to the overall purpose. I am sure that the Biscuit Banter Breakfast, the hos-

*Address delivered by Mr. Kennedy at the First Annual Banquet Midwest Section, ITE, January 11, 1952. Mr. Kennedy is chairman, ASCE Technical Program; and chairman, Technical Program Coordinating Committee for all societies taking part in the Centennial during the period of September 3-13.

pitality provisions, the ladies program and excursions, which are commonly a part of our meetings, can be given special direction because of the Centennial.

In conclusion let me say that the Centennial of Engineering 1952 offers a real opportunity to tell the public the story of traffic engineering and to cooperate with other professional engineers in an essential public education program.

(Continued from page 216)

Bus Survey

In 1950, the Traffic Engineering Department conducted a bus survey in an effort to improve transit operations within the city. The recommendations brought about as a result of the findings in the survey were:

1. A new route system.
2. A revised schedule system, including running time and headways.
3. Location and size of bus stops.
4. Transfer points.

One-Way Streets

In 1948, two pairs of east and west streets were recommended for one-way operation in the central business district. These streets were to operate along with one pair of north and south streets already in operation. The recommended streets were adopted, within the central business district, and put into operation, making a total of about four miles of such streets within the central business district. They have proved to be highly successful in the moving of traffic with a consequent reduction in the number of accidents.

Conclusion

In the National Traffic Safety contest for 1950, the City of Charlotte was awarded second place in its population group for outstanding achievement in Traffic Engineering. This award was based on all improvements including traffic control devices, traffic surveys, street lighting, intersection redesign, and traffic administration. We feel that this is indeed an honor since the department has only been in operation for a few years and this was our first entry into the contest.

It is our belief that our achievements in traffic engineering have been a direct result of the cooperation of the motoring public and the other agencies of the city government with the Traffic Engineering Department. We have found that the majority of the people are quick to recognize a worthwhile improvement and although there are instances when the minority must suffer some degree of inconvenience in order to aid the majority, a fair trial of any good idea will demonstrate its merit. Some ideas which look good at a glance are later found to be unworkable when put into practice, so it is therefore advisable that such plans be tried on an experimental basis at first. Then minor changes can be worked out to satisfy all concerned. Projects which do prove successful and win the confidence of the people brings them around to thinking in terms of more improvements; they offer suggestions which many times prove worthwhile in merit and they then lend ever-growing support to the traffic engineering program.

The two newspapers in Charlotte have also made great contributions to our program. Their help in explaining our objectives to the public has been very instrumental in the success we have had.

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By Benedict G. Barkan (Assoc. Mem., ITE)
Assistant City Planner
City Planning Commission
Syracuse, N. Y.[1]

A Parking Meter Revenue "Contour" Map

Introduction

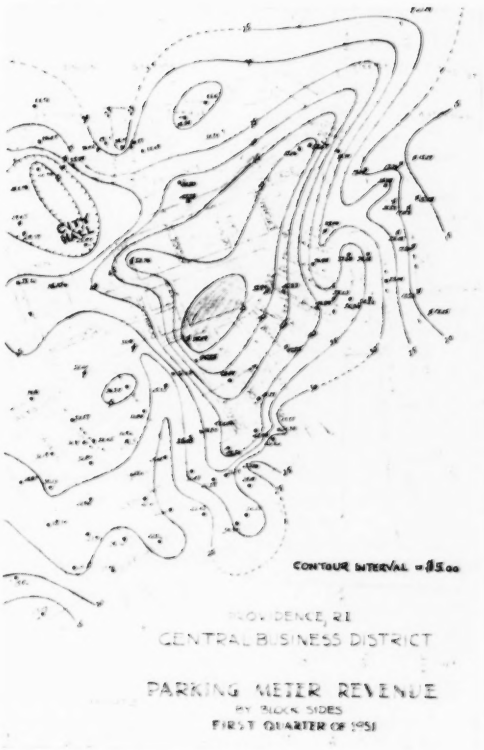
The accompanying "contour" map shows the results of a parking meter revenue study made in Providence, covering the first quarter of 1951. No record of the efficiency of individual blocks of meters in the Central Business District had ever been made previously, as far as could be ascertained by the writer; the study described here was an attempt to do so.

Method

A record of collections from individual parking meters was available from the City Finance Department beginning January 1, 1951. However, no simple comparison of individual meters or blocks of meters could be made by collection periods, since meters in different blocks were collected at different intervals; collections were being made every second, third, or fourth weekday, Saturday excepted, on a schedule developed by the City Collector's office (responsible for meter collections) based on past experience. It was for this reason that the data were "lumped," to cover the entire three-month period, rather than expressed as daily or weekly income figures. During the period covered total meter income was very stable and conditions were as near average as could be desired: the weather was unusually mild for the January-March season; there was practically no street-or building-construction affecting downtown parking habits, and there occurred only one minor change in parking regulations affecting one side of a downtown street. Thus the quarterly figures might safely be multiplied by four to arrive at annual income figures.

Generally, income from actual block faces was used and divided by the number of meters to give an average figure. However, where blocks were unusually long or there was a large number of meters due to angle parking, or both, logical block segments were used. Conversely, in short blocks, cut up by alleys, loading zones or other no parking areas, logical groups of block faces were used, so as to provide an average for at least four or five meters. Individual meters that were known to be out of commission for one reason or another during the period studied, were omitted from the average. Likewise, meters which for unknown reasons produced unusually small amounts (as compared with others in the same group) were omitted. Average income ranged from $10 to close to $60, an annual amount of between $40 and $240 per meter.

At this point the study was yielding interesting figures, which, however, were extremely clumsy to refer to, for practical application; some kind of graphic presentation in map-form became necessary. The writer believed that an isogrammatic or "contour" type map could be developed from the information on hand. The computed averages were plotted on a base map of the Central Business District at points considered to be the "centers of gravity" of the block faces involved. A $5 "contour" interval was chosen, and "contours" were drawn in the conventional manner, the accompanying map being the result.



The writer found no method by which such variable factors as one-hour and half-hour parking as well as rush-hour parking prohibitions could be reconciled, and these must be kept in mind while interpreting the map (the original large map has a color key for easy differentiation of the several parking regulations).

Results

The map proved that several suspicions of cases of extremely low revenue at the fringes of the Central Business District were true, possibly justifying removal of the meters, a change to a longer parking limit, or both. On the other hand, in other fringe-areas, extension of parking meters appears to be warranted according to extrapolation on the map. Furthermore, a number of interior areas appear as "basins" or "valleys," and whether these were due to sustained mechanical or human failures may never be known. The retail shopping area appears as a "plateau" of between $30 and $35, or $120-$140 annually. The area of highest

(Continued on page 229)

[1]Formerly Associate Engineer in charge of Traffic Planning and Design, City of Providence, Traffic Engineering Department.

(Continued from page 220)

effect would be beneficial. Our experience here in Cleveland has been that a heavy burden of traffic on any street is not healthy for business operation. We are making every effort to remove this heavy traffic from the streets and put it on the freeways, and I would think that when we have succeeded in building a considerable part of the freeways that there would be an increase in business value to the major thorofares.

"Our experience here in Cleveland regarding private development adjacent to or near a freeway is that such development is not harmed. We are building our freeway in short sections, and where the harm really occurs is on the local street bottlenecks where the freeway ends as the traffic pours off the freeway on to local streets. Wherever a freeway terminates you are bound to have congestion, noise, confusion, which I don't think would have a healthy influence on property owners."

Los Angeles (City Engineer): "Owing to the extraordinary changes in real estate values arising in the last few years from other causes, it would be very difficult to assess the direct effect of parkway construction on the City's tax base. It has been the experience elsewhere, and it appears inevitable, that the direct benefit to property near a parkway and the advantage of improved transportation to more remote areas will far more than offset the removal of properties from the tax rolls in the acquisition of rights of way. In the case of the Hollywood Parkway it has been found that more than 90 per cent of buildings in the right of way were capable of removal to other sites. The cost of such removal has been a part of the right-of-way cost and the reconstituted buildings, which have been brought to conformity with modern building codes, have in general been more valuable after removal than before.

"In the case of the Arroyo Seco Parkway, which was opened to traffic in its present form in 1942, powerful opposition was brought to bear by the merchants of Highland Park, an adjacent business district served prior to parkway construction by a single major street paralleling the proposed parkway. The Chamber of Commerce representing this business district has recently gone on record with the statement that the parkway is its greatest single asset. A direct benefit is derived from the fact that some 50,000 vehicles a day now use the parkway, leaving the surface streets relatively free of through traffic and therefore suitable for their proper use by the local traffic from which the business district draws its customers. It is also interesting to note extensive residential development of a high order going forward in the immediate vicinity of this existing, heavily used, parkway."

New York (Director of Research and Planning): "In general, it appears to us that properly designed and suitably located freeways will have a beneficial rather than detrimental effect on the City tax base and on private development in the vicinity of the freeways.

"Only a few short stretches of this type of facility have been constructed in this city. Generally, these have been constructed through run-down or open areas. In such areas, freeway construction does not appear to have resulted in detrimental effects, but rather to have stimulated a limited amount of development. At present, there is under construction in this city a freeway (Van Wyck Expressway) through a residential section in good condition. It is expected that in this case the inclusion of suitable design features such as adequate landscaped strips between the express roadways and the adjacent property, will prevent any detrimental effects."

(Continued from page 213)

length of the trip on the surface, 55.4 minutes, was one-half hour more than would be required after the completion of the Harbor Parkway.

Similar test runs were made on the main east-west route paralleling the projected Santa Monica-Ramona Parkways between the towns of Santa Monica and El Monte. The average overall speed for the daylight hours over the 30 miles traveled was found to be 23.2 m.p.h. One hundred fifteen signals and 358 intersections were encountered. Speeds were reduced to less than 10 m.p.h. over some sections and the lowest recorded speed for any one-half mile was less than 5 m.p.h. The travel time via parkway was found to be exactly one-half that of the time for the surface trip, or a saving of 39 minutes.

Conclusions

Conclusions to be drawn from this accident study are that in urban areas similar to Los Angeles travel via parkway is made with one-fifth the accident risk and in one-half the time that the same travel is made on a similar surface boulevard even though three times as much traffic is moved on a parkway as on a boulevard. Furtherfore, urban conditions are vastly different from those in rural areas.

(Continued from page 219)

be encountered. This driver training undoubtedly will greatly aid in the decrease of safety island motor vehicle accidents.

Trial Installations Made

The recommendations resulting from this study were placed in effect at several of the accident prone safety island locations. Figure 3 is a photograph of one of the loading zones before the recommended changes were made. Figure 4 is a night photograph showing one of the zones after improvement.

Effectiveness of Improvements

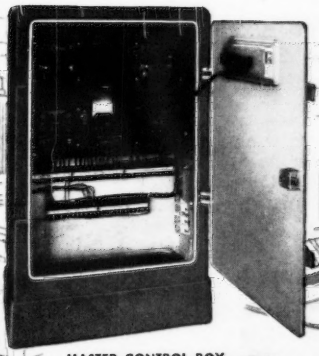
Apparently the safety measures have had satisfactory results as the number of accidents has been reduced greatly over a comparable period of time. During the months of July, August and September 1950, seven accidents took place at the four intersections listed in Table 2, while in 1951 no accidents occurred during the same months. Over this same period, the total number of accidents in Chicago increased from 20,085 to 20,293, or 1.03%.

If this decline is maintained plans are ready to provide all abutments with the above described lighting unit and striping, the cost of which comes to approximately $200 including beacon, new stanchion, bracket and painting.

It appears from all indications that reflectorized paint, reinforced by spot illumination (as provided by the base light of the beacon) leads towards improved discernment of objects in the line of traffic, and thus aids in decreasing the number of accidents. Tests with various striping patterns are being continued and will be reported at the next annual convention.

COORDINATION

Semi-actuated control with traffic selected cycle lengths and offsets



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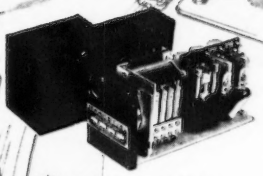

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By William R. McGrath (Jr. Mem., ITE)
Research Assistant
Bureau of Highway Traffic
Yale University

Accident Rates Based on Exposure Time

It is common practice in the United States and elsewhere to report motor vehicle accidents in terms of vehicle-miles traveled, vehicle registration, and population. Yet it is undeniably true that the primary aim of human beings is not maximization of distance traveled, numbers of vehicles or even numbers of people; but rather maximization of time spent in good health and life itself are primary considerations. Thus, the time index of hazard for any activity, whatever it may be, must come from a comparison of the number of accidental deaths or injuries which arise and the amount of time spent in that activity.

Starting from the premise that human beings are continuously exposed to the possibility of accident and are also continuously engaged in at least one activity, it is relatively simple to compute an average hazard level for any given population. For example, by regarding change in population size as negligible, it can be said that the 150.7 million people of the United States lived a total of 1.32×10^{12} person hours during 1950. During that period, they suffered a reported number of 90,000 deaths and 9,000,000 injuries.[1] The average accident rate, therefore, was 6.82 deaths and 682 injuries per hundred million person hours. With these average figures as a base, the relative hazard of any particular activity during the same year may be found, provided a reasonable estimate of the time spent in that activity can be derived.

For motor vehicle travel the method of estimating total time is outlined below. It is obvious that estimates and assumptions were required in arriving at the figures to be used. The exactness of any one of the factors can be disputed but that they are within reason will be obvious to those acquainted with national highway traffic characteristics.

Equation

$$\text{Person-time in vehicle travel} = \frac{\text{mileage}}{\text{speed}} \times \text{vehicle occupancy}$$

Factors Used

Mileage (1950)	=	233 billion rural
	=	233 billion urban
Rural Speed	=	40 mph
Urban Speed	=	25 mph
Vehicle Occupancy	=	1.7 persons per vehicle

$$\frac{233 \times 10^9}{40} \times 1.7 + \frac{233 \times 10^9 \times 1.7}{25} = 25.8 \times 10^9 \text{ person-hours}$$

Thus it is estimated that the people of the United States spent 25.8 billion hours in motor vehicles during 1950. During that time, they suffered a reported 35,000 deaths and 1,200,000 injuries involving the use of motor vehicles. The hazard rate for motor vehicles, therefore, was 136 deaths and 4650 injuries per hundred million person hours. We may conclude that using a motor vehicle is 20 times as likely to cause death and 7 times as likely to cause injury as any average activity pursued for the same length of time.

The greater difference between these two hazard index levels, 20 for deaths and 7 for injuries, brings out another aspect of motor vehicle hazard—that of severity. It must be concluded that when a motor vehicle accident does occur, it is three times as likely to cause death rather than nonfatal injury as is the average accident.

There is a logical objection to the above derived figures which must be considered. This objection arises from the fact that some of the accidents must certainly involved persons who were not using motor vehicles. It might be said that this exposure time shall also have been included in the total expense time. This argument might be refuted by stating that in consideration of any one activity only those persons engaged in that activity should be counted as exposed regardless of the nature of any accident resulting from this exposure. This would have the advantage of showing exactly the proportion of accidents that would not occur if some one activity were eliminated or rendered absolutely accident free. Also, if the hazard indices and all possible activities were computed the total exposure of all persons would be exactly accounted for. On the other hand, some accidents would inevitably be counted twice which would result in hazard indices for all activities which average to more than the national average. Conversely, inclusion of the exposure time of all persons engaged in one activity but suffering accidents attributed to some other activity would result in some persons' time being counted more than once with the consequence that the average of the indices derived for all activities would be less than the national average.

As a compromise, it may be considered that any accident to a person and his exposure time should be included only in the hazard index attributed to the activity in which that person was engaged at the time of accident. For motor vehicle deaths this approach required removal from consideration of deaths inflicted by motor vehicles upon persons who were not using a motor vehicle themselves. In particular this involves the removal from the 35,000 reported deaths for 1950 of the 8700 pedestrian and 450 bicyclist deaths, leaving a total of 25,850 deaths and a hazard rate of 100 deaths per hundred million person hours. It is seen that the index still remains about 15 times the nation average.

Another way of viewing these conclusions is shown in the following table. Consider the fact that if all activities were equally hazardous, then the percent of total time spent in any one activity would be equal to the percent of total accidents generated by that activity. Using the figures already presented, it can be seen that the people of the United States spent only about 1.95% of their time using motor vehicles. During that time they are involved in 39%

EDITOR'S NOTE: *Your comments and discussion on this article are invited. Address letters to Mr. McGrath, 317 Strathcona Hall, New Haven, Connecticut.*

[1] *Accident Figures from "Accident Facts," 1950, National Safety Council.*

of all reported fatal accidents or, more conservatively, the vehicle users themselves suffer 29% of all fatal accidents.

ACCIDENTS AND EXPOSURE TIME IN PERCENTS

Class	Percent of Total				
	Deaths in 1950		Injuries in 1950		Exposure Time in 1950
All Motor Vehicles	39		13		
Vehicle Users Only		29		11	1.95
All Others	61	71	87	89	98.05

In conclusion, a method of examining the relative hazard of any one activity compared with all activity has been explored. Based on the proportion of exposure time to total time, it is believed to be a method which best expresses hazard in terms of the natural human instinct of self-preservation. Applied to motor vehicle use, the results indicate that such use is indeed a hazardous activity. It may be concluded that rightfully a great proportion of any effort expanded on reduction of accidents should be applied in the field of highway traffic.

(Continued from page 225)

income was virtually coincident with the half-hour parking district, a fact which should serve to offset repeated requests to permit longer curb parking in this area. It should be pointed out that this area includes the banking and office district as well as some wholesale businesses. Here is another indication, demonstrated in other cities, of the importance of short time parking to the "business" parker.

In at least one case known to the writer, the low parking demand indicated on the "contour" map has served to justify a complete parking ban on one side of a congested major street where merchants previously had protested strongly against a rush-hour prohibition.

Gas Tax Increased by Eight States in 1951

State legislatures, during 1951, faced heavy demands for additional highway revenues. The question was under consideration in practically all states and eight states passed an increase in the gasoline tax, while 15 states turned down similar proposals.

An increase from four to five cents per gallon was voted in New Hampshire, North Dakota, South Dakota, Utah and Wyoming. Illinois increased its rate from three to four cents, effective August 1 and this rate will be increased an additional one cent on January 1, 1953. Massachusetts increased its tax rate from three to four and three-tenths cents per gallon on October 1, 1951. Michigan voted a one and one-half cent increase per gallon on June 1, 1951.

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TRAFFIC NEWS

Bureau of Traffic Safety Formed in New Jersey

Arnold H. Vey, member ITE, formerly New Jersey's State Traffic Engineer, has been named Director of the newly created traffic safety operational unit in the New Jersey Department of Law and Public Safety. Temporarily designated as a Bureau of Traffic Safety by Executive Order of Governor Alfred E. Driscoll, the new organization is expected to be given the status of a Division by action of the present Legislature.

The creation of the new Bureau provides for the first time in New Jersey a state agency specifically charged with coordinating the activities of all other official organizations within the State having any responsibility for the operational control of traffic and safety. In addition to its coordinating function the new Bureau will initiate and conduct research studies in all phases of the traffic problem.

Governor Driscoll's action was a further step in an administrative re-organization program begun in 1948. Studies of the traffic problem in New Jersey indicated the need for a clarification of highway operational responsibilities among State Departments and the establishment of a permanent machinery for effective coordination at the State level and between State and local governments as well. As a result of these studies the new Bureau has been established and will be staffed for the most part with personnel transferred from other State Departments. In addition, certain employees of other State Departments will perform appropriate liaison duties with the Bureau. Plans for the coming fiscal year call for an increased technical staff with opportunities for technicians experienced in the field of traffic safety and research.

The new Bureau will operate under the Department of Law and Public Safety reporting directly to the Attorney General and the Executive Order also provides that he shall establish a State Coordinating Council on traffic and safety comprising State, county and local officials. It will be the function of the Coordinating Council to review recommendations of the new Traffic Safety Bureau, conduct hearings on subjects pertaining to traffic and safety and present suggestions for study and development to the Bureau of Traffic Safety.

Specifically, the State Coordinating Council will consist of the following officials: The Attorney General as Chairman, State Highway Commissioner, State Commissioner of Education, Chief of Staff of the State Department of Defense, Commissioner of Conservation and Economic Development, Superintendent of State Police, Director of the Division of Motor Vehicles and Director of the Division of Traffic Safety. Chairman of the Committee on Public Safety of the Association of County Freeholders, Chairman of the Committee on Public Safety of the New Jersey State League of Municipalities, Chairman of the Committee on Public Safety of the State Association of Chiefs of Police and the Executive Director of the New Jersey State Safety Council.

When Governor Driscoll announced the new Division of Traffic Safety, he said that immediate and realistic action must be taken to curtail the appalling and mounting loss of life, personal injury and destruction of property on our highways. He also pointed out the present day traffic problems and the ever-increasing number of vehicles on the road has reached a point beyond the facilities of any single agency or group and in order to maintain necessary supervision of traffic flow, minimize traffic congestion and to extend as far as possible the safe and efficient use of existing highway facilities, a realistic program, coordinated for action among all officials agencies as well as civic groups is imperative.

In addition to providing proper guidance and technical assistance among all State, county and municipal agencies vested with authority in the field of highway transportation, the new Bureau will be responsible for the elimination of any over-lapping, duplicating or conflicting efforts being made to improve the efficient use of the State's roadway network. A broadened and continuing program of driver education and greater uniformity in the enforcement program are other activities to be undertaken by Mr. Vey's Bureau.

The creation of this new Bureau of Traffic Safety with its State-wide responsibility for traffic safety operation is another advanced step in accident prevention and traffic expedition being taken by New Jersey.

British Road Group Completes Educational Survey

The British Road Federation has just announced results of an educational survey to determine what courses are offered by British universities, colleges and technical schools in highway and traffic engineering.

From replies received in a canvass of 28 institutions, the following conclusions were drawn:

1. Specialized courses and research on subjects relevant to highway engineering (surveying, soil mechanics, design of curves, road surfaces) are available in ten schools.
2. Highway engineering, per se, is available in one school as a post graduate course.
3. Traffic engineering is available in varying degrees at two schools.
4. Remaining institutions offer courses in civil engineering, with no specialized courses in highway or traffic engineering.

MEMBERSHIP INFORMATION

may be obtained by writing to:

Executive Secretary

Institute of Traffic Engineers

Strathcona Hall

New Haven 11, Connecticut

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Seven Additional Engineering Groups Will Participate in Centennial

Added impetus was given recently to the plans for the Centennial of Engineering to be celebrated in Chicago during the coming summer with announcement that seven additional national engineering societies have voted to participate actively in the big project.

According to Lenox R. Lohr, president of the Centennial, addition of these new groups brings the number of societies that will hold national meetings or other special ceremonies during the celebration up to 48. Their inclusion in the program will also mean several thousand additional Centennial visitors to Chicago which already had been planning to play host to at least 35,000 delegates and other guests while the engineering bodies are in session.

The seven latest societies to vote participation follow:—American Society of Lubrication Engineers, Illinois Society of Professional Engineers, Institute of Radio Engineers, National Conference on Industrial Hydraulics, National Council of State Boards of Engineering Examiners, National Society of Professional Engineers, and the recently formed Society of Women Engineers.

The Institute of Radio Engineers and the National Society of Professional Engineers are among the largest technical bodies in the world. The former has more than 20,000 members; and the latter, 25,000.

Heaviest attendance during the Centennial is anticipated during the convocation program scheduled early in September although several features open to the general public are tentatively planned for July inaugurals. *The Institute of Traffic Engineers* will participate in the Centennial. The next annual meeting of the *Institute* will be held in Chicago on September 8-11, 1952.

The Centennial will mark the 100th birthday of the formal establishment of engineering in this country, as distinct from military engineering, on a recognized professional career basis.

It will also be the first time in the history of engineering that practically all branches of the profession have ever joined together in a mutually planned meeting of national proportions.

Mexican Highway Budget Tops Combined Army, Navy, Air Force Funds

Mexico's 1952 Federal highway budget totals 435 million pesos (8.65 per U. S. dollar), greater than the combined appropriations for the army, navy and air force. The total budget for communications is 696 million pesos, largest department allocation in the 3,995 million peso federal budget.

The Federal highway appropriation provides principally for primary roads. In addition to this, the National Rural Roads Committee administers a program for secondary roads totaling more than 50 million pesos. Funds for the committee's program are provided by the various State governments, the tire and motor industries, the Federal government, and, to a lesser extent municipalities, farmers and local business directly affected by a secondary road improvement.

The Mexican highway program includes main trunk lines linked with the United States, a criss-cross network of feeder roads joining agricultural and industrial zones, and modern express roads to connect the capital with key cities.

Traffic Volume Will Be Heaviest on New Jersey Turnpike

Traffic to date on the New Jersey Turnpike indicates that this new highway will be the heaviest traveled toll road in existence, Paul L. Troast, chairman; George F. Smith, vice-chairman, and Maxwell Lester Jr., treasurer, have stated in their report to Governor Alfred E. Driscoll and members of the State Legislature.

"No definite comparison can be made with traffic estimates as we have not yet had any extended experience with the whole of the Turnpike opened to traffic," the three Commissioners add. "Statistics indicate that the number of vehicles carried in the 57 days of operation from November 5 to December 31, 1951, was 51 per cent over preliminary estimates and gross income 21 per cent above that estimated. In the period 790,066 vehicles passed through the Turnpike toll booths, traveling 38,275,906 vehicular miles and producing $587,355 in revenue. The discrepancy between the figures is largely due to the opening of the Turnpike in sections rather than as a whole, with the resultant lower average revenue per vehicle.

"It is interesting to observe that on Sunday, January 20, a few days after the full 118 miles of Turnpike were placed in operation, 59,590 vehicles used the facility. These vehicles paid $49,941 in tolls. While the figures contain some 'curiosity traffic,' which is likely to continue for several months, it is apparent that traffic will be in excess of that estimated by the engineers. The traffic and revenue studies of the engineers project an average daily use of the Turnpike by 23,000 vehicles in 1952. This figure is weighted by heavy summer traffic with which we have as yet had no experience."

One-Way Streets Prove Successful In Spokane

Several weeks' experience with one-way traffic on Second and Third Avenues in Spokane make it clear that the change from two-way operation is a success. The idea of making Second and Third Avenues one-way has been in the back of the minds of public officials for some time, but only in recent times have the traffic congestion and accidents arrived at the unbearable stage. In the summer of 1950 the City and State made a joint study of the Third Avenue problem, and it was factually established that relief measures were overdue.

It took several months to set up properly the two Avenues as one-way arterials. The major job was to develop a diagonal, west-east connection. The details of signing were worked out jointly by City and State representatives. In addition to standard one-way arrow signs, customary route markers and destination signs, there were certain unique methods used to inform motorists. Large, overhead, "ONE-WAY, USE ANY LANE" signs were placed near the point of beginning of one-way operation. Conspicuous, over-the-lane "LEFT TURN LANE," "NO TURN LANE" and "RIGHT TURN LANE" signs were located well in advance of major intersections to make motorists aware of which one of the three travel lanes they should use. "ONE WAY" signs (similar to those being used in the City of Portland, Oregon) were placed on mast arms in connection with the corner-mounted signals at the major signalized intersections. On the north-south streets which have stop sign treatment, the stop sign, one-way arrow and street name signs were conveniently combined on a single sign post.

Prior to the opening of one-way operation, there was much advanced publicity concerning the usage and benefits

of the system. Two days before the changeover was made, the newspapers came out with a favorable, leading editorial entitled, "Let's All Help to Make It Work," and published sketches and descriptive information on the one-way street operation plan. The Spokane Area Safety Council published and distributed a brochure on the system.

Finally, the one-way plan was placed in operation on Sunday, December 2, 1951 at 12:01 A.M. The changeover was uneventful, but well received. Up to this time it had never been realized by the public that it would be possible for local and highway traffic to pass east and west through the main part of Spokane without stopping for traffic signals. With motorists now moving unimpeded east and west through the City, the comment is often made "why didn't someone think of this one-way system a long time ago." The other comment often made is "when are more local streets going to be put under one-way operation."

The total traffic volume for the two Avenues increased by 15 per cent as between the week "before" and the week "after" one-way operation. With the coming of fair weather and higher traffic volumes in the spring, it will be interesting to note to what extent the new system will attract traffic.

National Parking Association Increases Staff

B. M. Stanton, President of the National Parking Association, has just announced the appointment of a staff member to the organization. He is Robert H. Blundred of Washington, D. C. His title will be Assistant to the President. He is a native of Syracuse, New York.

The association was organized last September in Chicago. The temporary offices are located at 320 West 21st Street, Norfolk, Virginia. The permanent office will be established in Washington, D. C., at a later date.

The National Parking Association members consist of private parking lot and parking garage operators throughout the United States. Its primary objective is to assist in determining and solving the "parking requirements" of cities suffering from "growing pains." The association is planning the publication of a "Parking News" newsletter that will serve as a clearing house of information on problems that confront the parking operator. A magazine containing articles on various phases of parking will also be issued.

"The National Parking Association is anxious and willing to cooperate with city officials in solving local parking problems," Stanton declared. "Consequently, our Board of Directors decided to select a man acquainted with city government officials and problems, who can act as liaison officer to coordinate the mutual objectives of city officials and the private parking operators throughout the nation. Blundred is qualified for this responsible task."

The association is already recommending to city officials a program of action for solving a community's "parking requirements." This plan is based on cooperation amongst all groups interested in solving the problem. This group usually consists of city officials, merchants, property owners, and private parking operators.

This cooperative program follows a "three step approach." First, an "available space survey" must be conducted to determine the extent to which the existing parking facilities are used. The city officials must "get the facts" as to whether the existing facilities are adequate or insufficient to accommodate the demands for parking space. Second, "cooperative plans" must be developed to assure "maximum efficient use" of existing off-street parking facilities. In this, a public educational program would be conducted and studies made for possible changes in methods and operating procedures of existing parking facilities. Third, if the results of these two steps indicate the need for additional off-street facilities, a "cooperative program" should be adopted to provide these needed facilities. It is the responsibility of city officials, merchants, property owners, private parking operators and others interested in parking to work together in developing this "cooperative plan." The association is preparing a pamphlet which describes this cooperative program in detail.

The association is assembling data on succesful plans in operation in cities throughout the country. Through its press clipping services, it collects articles on off-street parking appearing in newspapers in all cities of 50,000 population and over. For example, during January over 700 individual articles were studied and assembled into the association files.

The National Parking Association offers its services to city officials and others in fulfillment of its recommended "three step approach" to the parking problem. Also, private parking operators are urged to contact the association at 320 West 21st Street, Norfolk, Virginia, for further details as to its "aims and objectives."

National Movement Launched to Get America Out of Traffic Muddle

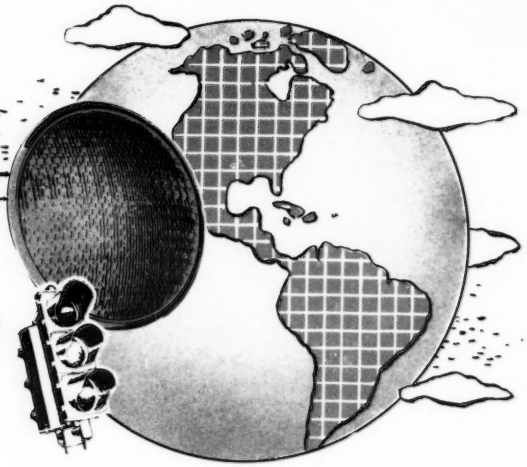
The "first nationwide good roads movement in more than a quarter of a century" has been launched by executives of forty national organizations representing millions of owners of motor vehicles, as well as automotive and allied industries.

Meeting in Washington, D. C., on February 29, the highway transportation leaders organized a Project-Adequate Roads Committee, or National PAR Committee. Stated purpose of the new organization is to arouse public action to get the nation out of the traffic muddle. The movement was compared in scope to the "Out of the Mud" campaign of the 1920's.

Acting as the organization's temporary Operating Committee will be Paul B. Reinhold, President of the American Road Builders Association; L. S. Wescoat, President of the Pure Oil Company and Chairman of the American Petroleum Institute; Albert Bradley, Executive Vice-President of General Motors and Chairman of the National Highway Users Conference, and in an ex-officio capacity; Arthur M. Hill, Chairman of the Executive Committee of the Greyhound Corporation and President of the National Association of Motor Bus Operators. Mr. Hill will serve as temporary chairman of the PAR organization until its next meeting, to be held in conjunction with the Fourth Highway Transportation Congress meeting in Washington, D. C., May 6, 7 and 8. Arthur C. Butler, Director of the National Highway Users Conference, was elected permanent secretary of the National PAR organization.

Albert Bradley, Chairman of the National Highway Users Conference, which initiated formation of the Committee, said the group's first concern will be to urge defense officials to a new viewpoint of the highways' place in the nation's defense. Mr. Bradley, who is also Executive Vice-President of General Motors, said highway improvement is as indispensable to our defense effort as "armaments, power or other primary elements." He said further that in many cases, defense officials seem to have taken the position

World famous cross-roads



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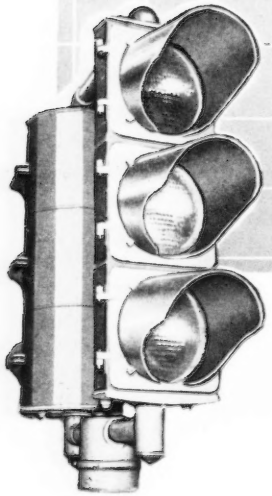

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that highways are "expendable" and that this attitude is reflected in meager allocations of scarce materials needed for highway improvement.

The Committee's other major concern is of a long-range character. According to spokesmen, it will be to stimulate continuing activity in highway improvements so as to "put the nation's highways on a PAR with the nation's needs."

The NHUC Chairman emphasized that the organization made possible a unity of effort, without placing restrictions on the individual policies or action of participating groups. He said that the functions of the committee would be: to stimulate efforts for highway improvement to meet current and continuing needs; to act as a clearing house for engineering and highway legislation information; and, in particular, to provide information to the public largely through the use of the advertising and public relations departments of participating groups.

For its long-range concern of stimulating continuing road programs in all the states, the National PAR Committee will look to the Sufficiency Ratings systems. Sufficiency Ratings are a new mechanism for determining accurately relative road needs, as a means of establishing priorities and as a basis for programming.

Included in PAR's objectives was the obtaining of proper classification of roads into systems, funds for adequate highway systems, the dedication of highway use taxes to highway purposes, fair distribution of highway costs, and improved highway administration.

Highway Structural Steel Shortage Will Remain 'Critical'

The availability of structural steel shapes and plate for highway construction in the third quarter of 1952 will continue to be "critical" but an increase in the supply of reinforced steel bars is expected to cut down the number of delayed road projects, A. C. Clark, Deputy Commissioner of the Bureau of Public Roads, said recently.

Improved supply of reinforcing bars, Mr. Clark said, "should permit construction of reinforced concrete structures in connection with grading operations, substructures for large steel bridges, and the building of reinforced concrete pavements."

Speaking at the annual North Atlantic States Meeting of the American Association of State Highway Officials in Atlantic City, Mr. Clark reviewed the difficulties which have confronted the necessary road construction work under the Controlled Materials Plan. He discussed in detail the following actions which are being considered or taken by BPR to permit more intensive construction planning and timing so that steel can be utilized in the calendar quarter in which it is allotted.

1. Permit state, county and local highway departments to self-certify road projects which will require 25 tons or less of carbon steel—not more than two tons of which is structural shapes. Under this authority, hundreds of small projects throughout the nation could get underway almost immediately and the steel tonnage necessary to complete them would not be reduced from the total highway steel allotment.
2. Once a state has approved a road project which is under the jurisdiction of a county or local highway department, BPR is considering making a direct allotment for the necessary steel to the highway department concerned. Under present procedure, BPR has a quota for each state from which tonnages are allotted for each job.
3. There is considerable lead-time required in the design of highway structures and the awarding of contracts and general preparation of the work by steel fabricators before the structure can be erected in the calendar quarter for which allotments are made. BPR is, therefore, asking for increased advance allotments of steel to permit this construction planning. Through this method it is hoped to cut down costs of construction by avoiding "special delivery" prices.

Minnesota Mining Opens New Boston Office

Opening of a new Boston branch sales office and warehouse was announced by officials of Minnesota Mining & Manufacturing Co. recently.

The new building, a one-story structure featuring modern exterior and interior design, is located at 1330 Centre Street, Newton Center. Facilities include truck docks and railroad sidings.

W. M. Hobelsberger, Boston office manager, said the new unit is another link in 3M's nationwide expansion program aimed at improving service to industrial and retail customers across the country. The Boston branch serves New England.

Other branch officials who will have headquarters in the new office are J. H. Hargreaves, abrasives sales manager for industrial and refinish trades; A. S. Drew, sales manager for general line tapes; H. B. Kosanke, sales manager for retail cellophane tape; and J. E. Warner, sales supervisor for Reflective Sheeting.

The new warehouse also will stock adhesives and electrical tapes. Electrical tape sales will continue under the direction of E. F. Gregg, with headquarters in New York. Howard Norman, also of New York, is sales manager for adhesives.

Hardware maintenance sales of the Boston Branch are under the direction of H. G. Kelly of New York.

LOOKING AHEAD

APRIL 1-4, 1952—NEW YORK, N. Y.
Greater New York Safety Council—22nd Annual Convention, Hotel Statler.

APRIL 28-30, 1952—WASHINGTON, D. C.
Annual Meeting, Chamber of Commerce.

MAY 6-8, 1952—WASHINGTON, D. C.
National Highway Users Conference—4th Highway Transportation Congress.

SEPTEMBER 8-11, 1952—CHICAGO, ILLINOIS
Annual Meeting, Institute of Traffic Engineers, Hotel Sherman.

SEPTEMBER 8-13, 1952—CHICAGO, ILLINOIS
Illuminating Engineering Society National Technical Conference, Edgewater Beach Hotel.

SEPTEMBER 20-24, 1952—ATLANTIC CITY, N. J.
Annual Meeting, American Transit Association.

SEPTEMBER 28-OCTOBER 2, 1952—KANSAS CITY, MISSOURI
International City Managers Assn.

SEPTEMBER 29-OCTOBER 2, 1952—BOSTON, MASSACHUSETTS
Annual Convention, International Municipal Signal Assn., Inc., Hotel Statler.

OCTOBER 5-8, 1952—BOSTON, MASSACHUSETTS
American Society of Planning Officials, Copley-Plaza Hotel.

OCTOBER 20-24, 1952—CHICAGO, ILLINOIS
40th National Safety Congress and Exposition of the National Safety Council.

Secretary's Column

Members of the *Institute* and other readers of *Traffic Engineering* will be sorry to learn that Miss Ann Lincoln left the *Institute* for other employment on February 15, 1952. At the termination of her services, Miss Lincoln had served in the headquarters office for seven years. She became the assistant to the Secretary-Treasurer in 1945, two years after headquarters was moved to Strathcona Hall. In 1947, when the *Institute* started operations under a paid Executive Secretary, she became Business Manager of Traffic Engineering. She has been responsible for many improvements in the magazine and her loyal services will be sorely missed.

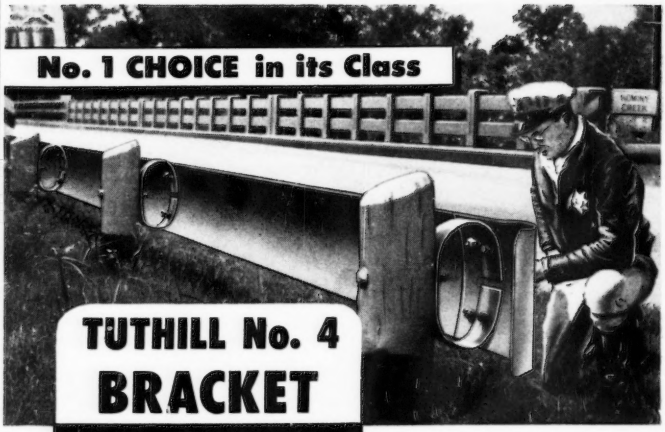
Written reports submitted in the competition for the 1952—"Past Presidents' Award for Merit in Traffic Engineering" should be received by July 8th, 1952. This award is intended to encourage the conduct and reporting or individual research and to recognize outstanding accomplishment.

Only Junior and Associate members under thirty-five years of age are eligible. The written report must furnish evidence that the applicant for the award was responsible for a substantial part of the conception, direction and interrelation of the work reported. If the achievement reported has been previously published, it shall have been published within three years prior to the closing date (July 8th, 1952) of the competition. The contest will be judged by a committee of past presidents; Harry E. Neal, Chairman.

Presentation of the award certificate will take place at the Annual Banquet during the Annual Meeting in Chicago this September. The winner of the award will be invited to present his winning entry at the Technical Sessions of the Annual Meeting.

The 1952 Yearbook is nearing completion and should reach members by April 15th. All members should send us by April first all changes in official title or address if the change has not been previously reported on the postal card sent to the membership for that purpose.

The next Board meeting is scheduled for April 4-5, in Chicago. In addition to official business to be conducted at this meeting, the Board will have opportunity to preview the 1952 convention site and attend a special meeting of the Mid-Western Section.



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SECTION NEWS

Midwest Section

The February meeting of the Midwest Section of the *Institute of Traffic Engineers* was held at Adolph's, 1045 Rush Street in Chicago with 30 members present. The highlight of the evening was the showing of movies made in 1934 and 1935 by our President, Bill Marston. These films showed Michigan Avenue with signals operating on a simultaneous system and later, with signals operating on a progressive system. Not only were these extremely interesting from a technical point of view but were quite entertaining. The vehicles, dress and activities of 17 or 18 years ago brought many memories back to everyone, especially those in any way connected with this particular project. Between reels several of the members related background information and anecdotes concerning this project and other activities in the middle 30's.

During the business portion of the meeting the proposed letterhead for use by the Midwest Section and the Annual Meeting Committee was approved by the membership. After some discussion regarding a permanent address for the Midwest Section it was decided to use the Transportation Building. Ralph Gross stated that arrangements could be made for the listing of the ITE on the bulletin board of this building and he was directed to proceed with such arrangements.

Reported by Ralph F. Gross
Secretary-Treasurer

Washington Section*

On November 28th, forty-two members and guests of the Washington Section gathered at the Army-Navy Club for the second dinner meeting of the 1951-52 season. As a preliminary feature the usual half hour before dinner was devoted to old friends getting together and shooting the breeze.

The speaker of the evening was Colonel R. H. Tatlow, President of Abbott, Merkt and Company of New York, whose subject was the Hecht Company Parkington development in Arlington, Virginia. The Parkington development is the newest suburban branch of a major department store and every innovation in this field has been applied to the project. The two principal features of the development are the Hecht Company department store and a multi-story parking building. With these two buildings as the core of the project the balance of the development is being devoted to other stores that will, in most cases, be competitive to the department store.

Colonel Tatlow, with the assistance of Messrs. Melincove and Greeler of the Hecht Company, gave a most informative explanation of the planning, design and operation of the development, especially that part relating to the parking facility. As evidenced by the questions during the discussion period all of those present found the presentation very interesting and helpful.

The January meeting of the Washington Section was held in conjunction with the 31st Annual Meeting of the Highway Research Board. The result was the largest turnout in the history of the Section. Ninety-eight members and guests gathered for the pre-dinner festivities and dinner held on January 16th at Kitty and Al's Restaurant. Among the guests in attendance were President Nathan Cherniack, Vice-President F. B. Crandall, Vice-President; Donald M. McNeil and Secretary-Treasurer Harry Porter Jr.

Mr. Harmer Davis, Director, Institution of Transportation and Traffic Engineering, Berkeley, California, gave an interesting talk on the organization and functions of the Institute. The presentation showed a very far-sighted view on the part of the California legislature when it authorized the establishment of the Institute as a part of the University of California. The audience, comprised of persons who would appreciate such fore-thought, showed a great deal of interest in the manner that this problem is being handled in California.

Section President Don Loutzenheiser adjourned the meeting at an early hour so everyone could return to the evening sessions of the Highway Research Board meeting.

Reported by W. D. Heath
Secretary-Treasurer

*EDITOR'S NOTE: *These news items were accidentally omitted in previous issues. Our apologies to the Washington Section.*

ON THE SHELF

Mrs. Kathryn Cassidy, Librarian
Yale Bureau of Highway Traffic

Barkley, Robert Emmanuel.

Origin-Destination Surveys and Traffic Volume Studies. Highway Research Board, 1951. (Bibliography No. 11).

Part I: A Review of the Literature; Part II: An Annotated Bibliography.

Chamber of Commerce of the United States.

Zoning and Civic Development. The Chamber, Washington 6, D. C., 1950. 43p. 30c.

A brief discussion in lay language about the use of zoning to promote sound urban development. It covers the changes in city development which have made zoning a necessity, the relation of zoning to a comprehensive plan and for all uses, the problem of protection vs. restriction, the role of the planning commission. It also lists and discusses twenty odd guides to better zoning. The final chapter tells how to go about "getting the job done."

Ferguson, Allen R.

Transportation in Virginia. The Committee on Transportation of the Advisory Council on the Virginia Economy, 301 State Finance Building, Richmond 19, Virginia, 1951. 111p.

A study of the transportation system of the State of Virginia, including rail, water, highway and air facilities and routes. One chapter deals with the geography of the state as it affects transportation problems, and one chapter deals with the transportation practices of small manufacturers in the state. The purpose of the study is to provide a factual basis upon which recommendations for the improvement of transportation can be founded.

Finch, D. M. and Andrews, Basil.

Highway Noise and its Measurement. Institute of Transportation and Traffic Engineering, University of California, Berkeley. (Research Report No. 6). 1951.

A review of the subject, particularly of the problem of truck noises and of the need for more accurate measurement of noises in the field. A bibliography is included.

Forbes, T. W. and Fairman, G. W.

An Improved Method for Determining Vehicle Speeds from Spaced Aerial Photos. The Institute of Transportation and Traffic Engineering, University of California, Berkeley. (Research Report No. 9-2). 1951.

Fort Wayne City Plan Commission

Parking Survey, 1950, Fort Wayne, Indiana. The Commission, 1950. 19p.

A parking survey including the results of interviews with drivers to reveal their downtown destinations.

Fresno, California, Mayor and City Commission.

Parking Survey and Program. Report prepared by DeLeuw, Cather and Company, consulting engineers. May be obtained from Traffic Engineer's Office, City Hall, Fresno, California. 1950. 43p.

Gerlough, D. L. and Schreider, F. D.

A Vehicle-Speed Counter. Prepared for presentation at Institute of Radio Engineers Session, National Instrument Conference, September 19, 1950. Institute of Transportation and Traffic Engineering, University of California. 1950.

A description of a "Field-type instrument which would maintain many of the features of the Vehicle Speed Distribution Recorder, but which would be more adapted to field use by operating agencies."

Glanville, W. H.

Road Safety and Road Research; a series of Three Cantor Lectures delivered to the Royal Society of Arts. London, The Society, 1951. Reprinted from the Journal of the Royal Society of Arts, 12th January, 1951. Vol. XCIX, pp. 114-192.

Lectures on the accomplishments which have resulted from the efforts to apply scientific principles to the problems of highway design and the regulation of traffic upon highways.

Great Britain Road Research Laboratory.

Recommendations for Plastic White Line Markings. The Laboratory, Harmondsworth, Middlesex, England. 1951. 7pp. (Road Note No. 9).

Recommendations for the composition of the plastic paint and of methods of laying it.

Highway Research Board.

Traffic Surveys by Post Cards. The Board, 1951. (Bulletin No. 41). 30pp.

Three papers presented at the 1951 annual meeting on methods, results, limitations, etc. of traffic surveys by post cards. The three papers were presented by Mr. E. J. Murray of the Ohio Planning Survey, Mr. C. A. Rothrock of the Planning Division, State Road Commission of West Virginia, and Mr. Maynard A. Bebee of the Bureau of Highway Planning, New York State Department of Public Works.

Highway Research Board.

Studies in Night Visibility. The board, 1951.

Bulletin No. 43 of the Highway Research Board, containing the following articles which were presented at the thirteenth annual meeting, 1951; "Factors Affecting the Perception of Relative Motion and Distance Between Vehicles at Night," by Donald R. Hoppe and A. R. Lauer; "A Study of the Relationship Between Photopic and Scotopic Visual Acuity," by J. E. Uhlaner and Irving A. Woods; "Field and Laboratory Evaluation of Roadside Sign Surfacing Materials," by James H. Havens and Allie C. Peed Jr.; "Filter Study of the Effect of Certain Transmission Filters on Visual Acuity With and Without Glare," by A. R. Lauer.

Indiana State Police.

Speed . . . the Greatest Contributing cause of Traffic Accident Severity in Indiana: a Compilation of Accident Statistics, Speed Studies and Corrective Measures Recommended by the Indiana State Police. The Police, Indianapolis 21, Indiana. 1950. 29p.

Indianapolis Off-Street Parking Commission.

Indianapolis Parking Survey and Program. The Commission, 1951. 106p.

A detailed survey of Indianapolis and suburban areas with sections on legislation, financing and the organization and operation of the parking commission.

Kansas City, City Planning Commission.

Expressways, Greater Kansas City: an Engineering Report for the Missouri State Highway Department and the Department of Commerce, Bureau of Public Roads. The Commission, 1951. $6.00.

A report prepared for the purpose of showing the people of Kansas City the need for a complete and interrelated system of expressways. It presents a Consolidation of previously made traffic surveys, suggests a proposed system of highways with preliminary engineering plans and estimates of cost, economic benefits and schedules of financing. The report is attractively bound and profusely illustrated.

Lindman, Bertram H.

Supplemental Bond Financing for Acceleration of the Ohio Highway Program. Published by the State of Ohio. May be obtained from the Ohio Department of Highways. 1951.

This report is supplementary to "Highway Finance," by Herbert D. Simpson and to "An Engineering Study of Ohio's Highways, Roads and Streets," by J. P. Buckley.

Maine State Highway Commission.

An Accelerated Highway Program. The Commission, Augusta, Maine. 1951. Unpaged, maps, tables.

A study made in cooperation with the Bureau of Public Roads. The boxed note on the cover of the report states that the program involves a $27,000,000 bond issue producing a $98,000,000 construction program. The bond issue supplemented by federal aid funds is to provide for a seven-year construction program beginning in 1953. The report lists the roads, by county which are to be improved and lists miles, traffic volumes, deficiency and costs of improvements.

Miami Beach, Florida, City Government.

Engineering Report on Proposed Municipal Parking Project. By Rader Knappen Tippetts Engineering Co. Revised November, 1950. May be obtained from the City Manager, City Hall, Miami Beach, Florida.

Moyer, Ralph A.

The Determination of "Initial Speeds" from Skidmarks in Motor-Vehicle Accident Investigations. The Institute of Transportation and Traffic Engineering, University of California, Berkeley. Research Report No. 7. 1951.

Moyer, Ralph A.

Effect of Freeways and Expressways on Transportation Costs. A paper presented before the Section on City Planning of the Commonwealth Club of California, San Francisco, April 3, 1951. Institute of Transportation and Traffic Engineering, University of California. 1951.

The paper presents data to show "that the monetary savings to the users of urban freeways for mixed truck, bus and passenger car traffic totaled about 4 cents per vehicle mile and that with savings of 4 cents per vehicle mile and traffic volumes exceeding 20,000 vehicles per day, the capital investments of from 1 million to 8 million dollars per mile on current freeway projects in the Bay Area are fully justified."

The Fight for Life; a Report on the 38th Year of the National Safety Council. The Council, 1951. 32p.

A report on the varied activities of the Council for the last year.

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Application of basic scientific principles, concepts and techniques in controlling physical conditions and operating practices with the objectives of accident reduction and increased convenience of highway and street railway traffic.

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Make application through the Executive Secretary, *Institute of Traffic Engineers,* by sending a statement of qualifications.

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City Traffic Engineer
City of Evansville, Indiana
Starting Salary $7,200.00

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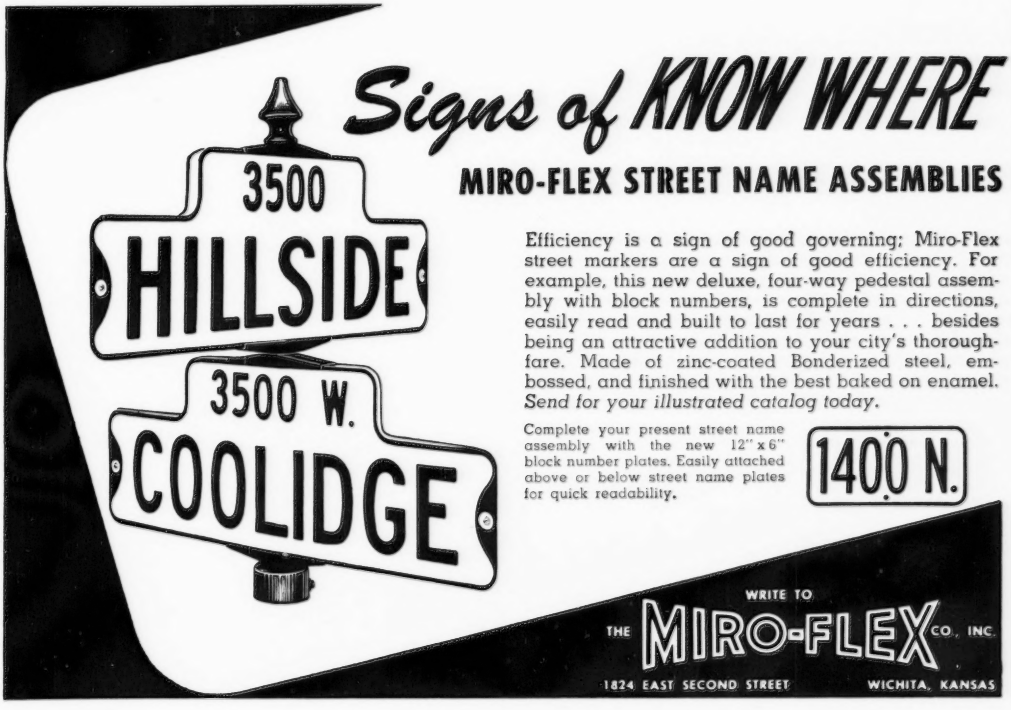
To advise Board of Public Safety on all traffic matters. To direct, under supervision of the Board, the use of signs, signals and markings, make recommendations, conduct surveys and supervise the installation and maintenance of traffic control devices.

Qualifications:

Applicant must be not less than 25 years of age. He shall be a registered professional engineer who has actively been engaged in the practice of traffic engineering for at least two years. Applicant must have thorough knowledge of traffic engineering techniques and ability to supervise and coordinate activities and to prepare reports.

Apply:

Mr. Harry E. Thompson, Exec. Sec., Mayor's Traffic Safety Commission, 117 Main Street, Evansville, Indiana.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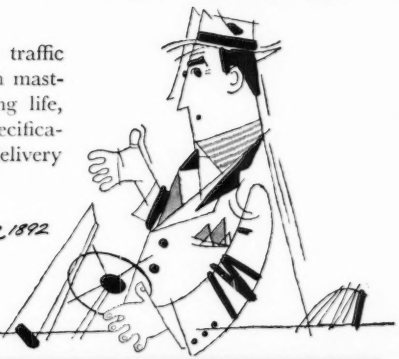

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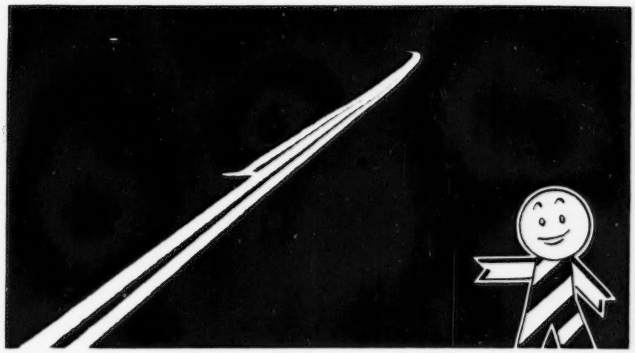

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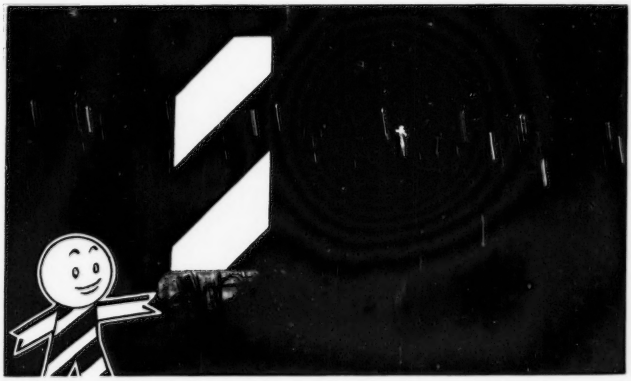

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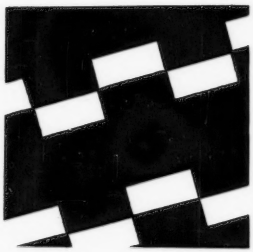

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